Rubber Journal and International Plastics

. 137 NO. 15 NOVEMBER 21 1959 Price 1s. Weekly

UNIV. OF MICHIGAN
DEC 1 1959

British Made

PEPTON 22

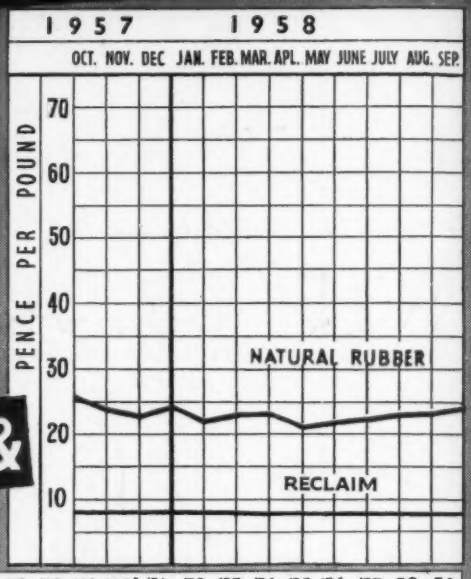
By using this British made catalytic plasticiser breakdown time can be reduced and production capacity increased.
It can be used with natural rubber or GR-S and is recommended for tyres, cables, sponge rubber and any type of compound where increased plasticity and improved processing are desired.

Distributors of PEPTON 22 for American Cyanamid Company

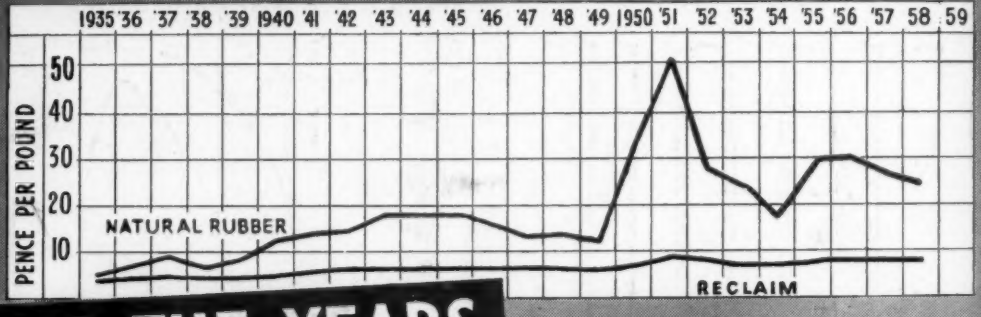
ANCHOR CHEMICAL CO. LTD., MANCHESTER, 11

London Office: Grand Buildings, Trafalgar Square, W.C.2.
Scottish Agents: J. & G. Hardie & Co. Ltd., 178 Fulton Street, Glasgow, W.3.
American Liaison and Service Branch: British Anchor Chemical Corporation, 366 Madison Avenue, New York 17, N.Y.

RECLAIM FOR PRICE STABILITY



OVER THE MONTHS &



OVER THE YEARS

RECLAIM serves the Rubber Industry as its best price stabiliser.
In addition to reducing costs it offers many other technical advantages.

Also suppliers of: DISPERSIONS, RUBBER LABELS, ACCELERATORS, ANTIOXIDANTS, PARACRIL RUBBERS, SYNTHETIC RUBBERS AND RESINS.

CONSULT... **THE RUBBER REGENERATING Co. LTD**

TRAFFORD PARK · MANCHESTER · 17

TELEPHONES Trafford Park 1424/8 TELEGRAMS "Regenerate" CODE Western Union Telegraph Universal-Edition

Rubber and International Plastics Journal

Volume 137 Price 1s. Post free 1s. 4d. No. 15

IN ITS 76th YEAR

November 21 1959

Editorial Director
JOHN D. COPEMAN

Editor
RICHARD ROWLAND

Consultant Editor
H. J. STERN
B.Sc., Ph.D., F.R.I.C., F.I.R.I.

Advertising Director
C. B. COPEMAN

Advertising Manager
A. S. KINGHAM

UK Area Representatives

M. J. Whelan, London

R. P. Finucane, Eastern Counties, Huntingdonshire, Hertfordshire, Bedfordshire, Buckinghamshire, Northamptonshire, Kent, Surrey and Sussex (Operating from London Office)

L. Quy, South and West of England and South Wales (Operating from London Office)

A. J. Legg, 55 Lee Lane West, Horsforth, Nr. Leeds. Tel. No. Horsforth 3845, North-East England, Lancashire, Yorkshire, Nottinghamshire, Lincolnshire and Derbyshire

W. Brown, 13 Allerton Road, Southport, Lancashire. Tel. No. Southport 5121, Scotland

E. A. Daniel, 'Brockenhurst,' 18 Thornhill Park, Streetly, Sutton Coldfield, Warwickshire. Tel. No. Streetly 1485, Midlands (excluding Staffordshire North of the A.5), Cheshire and North Wales

E. Burgess, 40 Parkside Drive, Maybank, Newcastle-under-Lyme. Phone 64678, Staffordshire North of the A.5

Foreign Representatives:

R. K. Larke, 7 Rue Pilaudo, Asnieres (Seine), France. Tel. No. Gresillons 42.24

G. Arnold Teesing, Rubensstraat 68, Amsterdam, Z (Netherlands). Tel. No. 727913

Albert Milhado & Co., G.m.b.H., Konigsallee 33, Dusseldorf, Germany, and Pompstraat 2, Antwerp, Belgium

Massimo Fano, Via V. Monti 14, Milan, Italy. Tel. No. Milan 808135

Editorial

NOTES OF THE WEEK 627

Articles and News

NEWS BRIEFS 628
PLASTICS RESEARCH 629
ADVANCES IN SYNTHETIC RUBBERS 634
KUNSTSTOFFE 1959—3 635
BUILDING EXHIBITION 640
BRPRA RESEARCH PROGRESS 649
RUBBER AND PLASTICS IN SOUTH AFRICA 657

Features

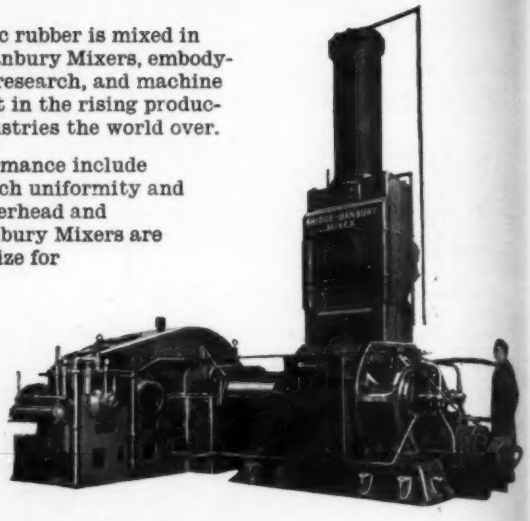
VIEWS AND REVIEWS 642
QUESTIONS CORNER 644
MEN AND MATTERS 646
CROSSWORD 648
HARRISONS AND CROSFIELD LTD. MEETING 651
BOOK REVIEW 652
PATENT SPECIFICATIONS 654
RUBBER STATISTICS 654
RUBBER MARKETS 658
INDUSTRY INTELLIGENCE 659
TRADE MARKS 660
PATENT LIST 661

Classified Advertisements . . . 661 Advertisers Index . . . 664

MACLAREN HOUSE, 131 GREAT SUFFOLK STREET, LONDON, S.E.1
Grams: 'Buns, Souphone, London' Phone: HOP 5712
Annual Subscription, including Postage: United Kingdom and Oversea, £2 15s.; Index (half-yearly), 10s. per annum extra. Published weekly. Registered at GPO as a Newspaper. Registered for Transmission by Canadian Magazine Post. Entered as Second Class matter at Post Office, Boston, Mass, USA, under the Act of March 3, 1879 (Sec. 397 P. L and R.)

No less than 85% of the world's natural and synthetic rubber is mixed in Banbury Mixers.* Small wonder then, that Bridge-Banbury Mixers, embodying more than a generation of practical experience, research, and machine design, continue to play an almost indispensible part in the rising productivity of the ever-expanding rubber and plastics industries the world over.

Indisputable claims for Bridge Banbury Mixer performance include optimum dispersion, speedier mixing, consistent batch uniformity and quality, increased production and a lower labour, overhead and maintenance cost per unit of production. Bridge Banbury Mixers are designed for round-the-clock operation. There is a size for every production requirement. Ancillary machinery matched to deal with the increased output and further streamline the production flow is available. **Bridge-Banbury Automation is continuous production.**



Fully detailed technical information is freely available on request.

* *Banbury is a registered trade mark in many countries throughout the world.*

* BRIDGE - BANBURY MIXERS *

. . . . ACCLAIMED AS THE ULTIMATE IN MIXER EFFICIENCY

BRIDGE

DAVID BRIDGE & CO. LTD. CASTLETON, ROCHDALE, LANCASHIRE.

In technical association with Farrel-Birmingham Co. Inc. Ansonia, Conn. U.S.A.

'Phone Castleton, Rochdale, 57216 'Grams: Coupling. Phone Castleton Lancs.

London Office:
Broughton House, 6, 7, 8 Sackville St. Piccadilly, W.1. 'Phone Regent 7480. Grams & Cables: Ederaceo, Piccy, London.

NOTES of the WEEK

Industrial Relations

THE National Safety Conference organized by the National Joint Industrial Council for the Rubber Manufacturing Industry was held on November 17 and 18. It was, as always, extremely well attended. In his introductory words, Mr R. W. Lunn, conference chairman, mentioned the current series of 'wild cat' strikes and drew a very telling comparison between the state of industrial relations in which such strikes can occur and the work of industrial safety where, because there was common agreement, there was little chance of controversy. The point was, of course, that it is the united aim, the realization of identity of interests, that makes for good relations, not only in industry but in all of man's activities. Good relations bring good results.

And Safety

IN the case of the Rubber Industry's Accident Prevention Committee, appointed by the NJIC, their efforts, and the response by a greater part of the industry, have resulted in 44% of their members achieving an accident frequency rate of 1.0 or under. Announcing this at the Safety Conference, Mr G. E. Beharrell, president, likened this figure of 1.0 (which means one loss of time accident in each 100,000 working hours) to the 'mythical barrier' of the four-minute mile. In the same way, the barrier faced by the Council had been the 1.0 frequency rate. Both barriers had been broken, by a minority. The difference between the two aspects of industrial relations mentioned above would seem to be that in the second case a preliminary target, or working target, has been achieved, and the job goes on. In the first, the 'wild cat' strikes, it is sometimes difficult to believe that there is any realization of the existence of a worthwhile target.

What Goes Up

THE price of natural rubber continues to rise to heights, in some cases to their highest levels since 1955, which must bring further delight to the hearts of manufacturers of synthetic. Spot at the time of writing is over 3s. 3d. a lb. In the opinion of some dealers, the price of natural may go still higher. The cause is, of course, the acute shortage of supplies of top grade rubber sheet. In turn this came about mainly because manufacturers thought that stockpile releases here and in the USA would result in a lowering of the market price. In the event, with purchases being kept at a minimum, stocks inevitably became low and there followed a considerable rush to buy. One of the remarkable present features of the rubber market is the firmness of prices for 1960 delivery, and it is likewise interesting to note that current buying of first grade rubber is almost entirely by dealers (and some speculators) to meet forward contracts previously made. The position reminds one that most balloons are made of rubber, and that sooner or later balloons come down. There is, however, little sign yet of any return to more earthy prices.

Publicity

ISSUED recently to members by the Publicity Committee of the British Plastics Federation is a two-page leaflet entitled 'Getting It In The Press.' The Committee states that it is anxious to increase the flow to the trade and technical press of information on plastics products. Included is some very sound and simple advice as to the requirements of the technical press. The advice is simple because the requirements are simple. In fact the only aspect of the whole matter that presents any difficulty so far as comprehension is concerned is that such advice should be necessary—as it most certainly is. The Committee stresses its belief that a vast amount of useful information in the industry is still untapped, and adds that 'nothing is lost by sending in material and much may be gained.'

Europeans All

AFTER the disappointments over the failure of the Free Trade Area Plan comes a warning to the President of the Board of Trade that the Outer Seven free trade association will itself cause come disappointment. Mr Maudling, who was addressing a conference jointly organized by the Midland area of the National Union of Manufacturers and the FBI, said that although the new trading organization would be of considerable value ultimately, a lot depended on the policies of the six countries of the European Economic Community, whether they were liberal minded or became restriction minded. Whether the six go one way or the other, it is clear that current moves to speed up the transition period before the Common Market comes fully into operation will probably bear fruit. This would mean that the transition period would end in 1965, not 1970. The problems involved are immense and there is not yet full agreement within the six, but, unless some definite moves are made—including some recognition that supra-national institutions must come in Europe—there are going to be more disappointments. There can be no doubt now, in fact one wonders why there was ever any, that the EEC is really going to change the face of Europe. However parochial may be the views of some, it should be realized, for better or for worse, that the UK is in Europe. Industry, as usual well ahead of the politicians, must make louder noises.

NEWS *Briefs*

FRANCO/GERMAN PLASTICS—CEYLON EXPORT DUTY—US MONSANTO STYRENE—STOCKPILE SALES — MEXICAN PROJECT — CARBON BLACK

●**Ceylon**—The Ceylon Government has decided to increase with immediate effect the export duty on all types of sheet rubber and on scrap crepe by 10 cents to 38 cents per lb. Last week the Government raised the duty on all descriptions of crepe rubber except scrap crepe also by ten cents to 38 cents per lb.

●**United States** — The Phillips Chemical Company is to construct a carbon black plant four miles northeast of Orange, Texas. The plant will have an annual capacity of 60 million lb. Phillips officials state that the plant will help meet growing demand for carbon black, which is in short supply. Completion is scheduled for the third quarter of 1960. The cost has not been disclosed. The plant will produce Philblack 'O' and Philblack 'I.'

●**United States**—The Dayton Rubber Company's Koolfoam Division has announced that prices on all latex foam products have been increased by an average of more than 5%. Constantly increasing material and labour costs during the last six months have made the move necessary.

●**Nigeria**—Quoting an official of the company, Barclays Bank DCO says in a report from Lagos that the Dunlop rubber plantations 31 miles from Calabar, will become the largest of their kind in the world when fully developed. Some 10,500 acres of high forest have been cleared and planted with 1,890,000 assorted rubber seeds selected locally. When completed the plantations will occupy 20,000 acres of land with a labour force of 5,000.

●**France**—Formalities have been completed for the formation of a new Franco/German chemical company, it is announced. Progil-Bayer-Ugine (PBU) has been established by Farbenfabriken Bayer AG of Leverkusen with two French companies Ugine and Progil. The firm will have a capital of 250 million francs with headquarters in Paris. Bayer's Canadian subsidiary, Bayer Foreign Investment Ltd., will also participate. The new company will produce and market isocyanates, polyesters and polyethers used in the making of polyurethanes. The latter products are basic materials of foams, adhesives and varnish. Part of the output will be exported. Products sales will be handled through Resines et Vernis Artificiels and through SOGEP. The new company is the second major Franco/German association in the chemical field. Badische Anilin and the French Kuhlmann group have formed Dispersions Plastiques.

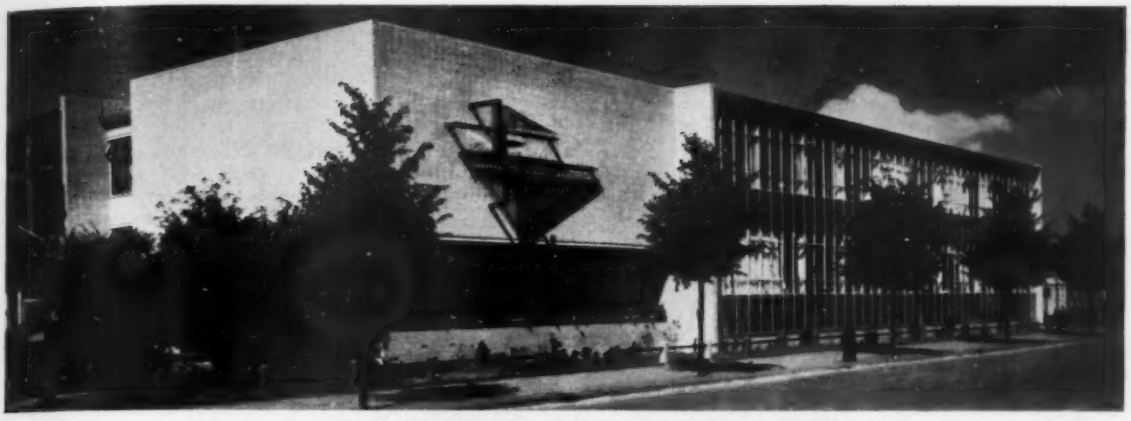
●**United Kingdom**—R. H. Cole and Co. Ltd. and East Anglia Plastics Ltd. jointly announce that agreement has been reached whereby R. H. Cole will purchase 50% of the share capital of the East Anglia Group. The management of East Anglia Plastics and its associated companies remains the same and its activities will continue to operate as in the past.

●**Indonesia**—Britain withheld sales of stockpile rubber for two or three years at a time of falling prices, the head of the British delegation has told the Colombo Plan Conference in Djakarta. Lord Lansdowne said: 'I think it is fair to say if we in the United Kingdom had consulted our own interests alone we would have begun to sell stockpiled rubber two or three years ago. But to have done so in a time of falling prices would probably have caused a further fall in the income of producing countries.' He was replying to a speech from the chief Ceylonese delegate, Mr Stanley de Soyza, who asked for some form of control in the movements of commodity prices to protect producer countries. Referring to the Colombo Plan generally he said steps taken by the United Kingdom during the current year showed 'clearly our determination' to play a full part in creating a general economic climate in which the fullest possible flow of trade and aid can be maintained.

●**Mexico**—Petroleos Mexicanos plans to spend 1,400 million pesos for the development of the Mexican petrochemical industry, according to Government sources. Production, once installations are completed, will top 1,300 million pesos a year. Initial production will be around 600 million pesos. The company said 262.5 million pesos would go into plants producing synthetic rubber.

●**United States** — The Monsanto Chemical Company plans to increase production of styrene monomer by about 200 million lb. a year, according to Mr Robert K. Mueller, vice-president and general manager of the plastics division. Mr Mueller said the first stage of the new facilities to be located in Texas City, Texas, is expected to be in operation by the first quarter of 1961. The increased capacity is needed to meet demand.

'This is my new assistant Mr Maltby — Mind if I sit in to see how he haggles?'—459



The new Koninklijke/Shell Plastics Laboratory at Delft, Holland

Plastics Research

SHELL OPEN NEW LABORATORY IN HOLLAND

A NEW plastics research laboratory, one of 16 now operated by the Royal Dutch/Shell Group in Europe and the USA, was formally opened on November 6 by Mr L. Schepers, managing director of the Royal Dutch Petroleum Company. Interestingly enough, it was almost exactly 10 years ago, in 1949, that the Group entered the plastics industry with the manufacture of PVC at its Pernis, Rotterdam, chemical plants.

The Royal Dutch/Shell Group of Companies produces plastics, resins and rubbers in eight countries in a range comprising Epikote epoxy resins, Carlona polythene and polypropylene, Carina PVC, Carinex and Styrocell polystyrene and Cariflex synthetic rubber, in addition to chemicals used in the synthesis of many other types of macromolecular compounds. The group is currently spending in the neighbourhood of £17m. a year on its research activities.

One Roof

The new laboratory, in Delft, Holland, is housed in a fine and impressively equipped building in which notable use has been made of plastics materials. It has a total surface area of 32,000 sq. ft. and cost, with the equipment, £350,000. At present, 150 people are employed under the director, Dr J. Overhoff.

Two years ago, the Koninklijke/Shell Plastics Laboratorium Delft (KSPLD) started activities in the Rubber Stichting building in Delft. From the beginning, the idea inherent in the project was that real progress in the field of plastics and related materials, and an increase in the fundamental knowledge, could be obtained with the greatest efficiency only by coordinating all relevant 'know-how' under one roof. Also realized was the necessity to acquire detailed knowledge of the relationship between the specific physical structure of the materials and their properties and, further, how this relationship influenced properties during processing and in the behaviour of the end-product.

While the prime aim of the new laboratory is to conduct research into the applicational development of plastics, resins and rubbers—and on the basis of the results to advise the manufacturing divisions — advice is also given to the Group's marketing organizations, so that the work is to some extent economic as well as technical. There is a further objective. That is that the laboratory shall be a centre for product evaluation in order to assist other Shell laboratories to develop new products in the high polymer field.

For all these requirements, the new building is well provided with modern equipment for testing the chemical, physical, mechanical, electrical and processing properties of the materials under investigation. In the light and airy main machine hall is a range of modern processing machines as used in the industry. These include injection moulders; extruders for compounding and granulating, for sheet, pipes and cable covering as well as vacuum forming and film blowing machinery; mixers, mills and presses. (A list of the machines in use at KSPLD will be found at the end of this article.)

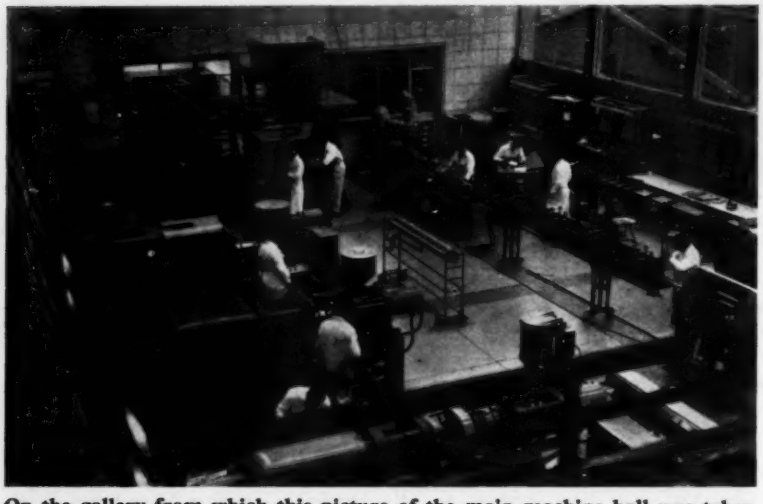
On the ground floor, alongside the main machine hall, are electrical and mechanical testing laboratories excellently equipped. Of particular interest is the 'Tri-Plot' apparatus (Epprecht AG, Zurich) which automatically registers tensile, tear, flexural, compression, creep and hysteresis test results and which, with its 'electronic load cell,' can load test from 5gm. to 5,000kg. Chemical and physical laboratories are on first and second floors and these are maintained at constant temperature and humidity. A feature of one of the chemical laboratories is the extremely efficient fume ducting (Vinitex) in PVC. In this installation, which is mounted against the wall, the fumes are drawn in through a grille. By blanking off part of this grille (with film sheet) fume extraction can be localized. The absence of a hood over the work bench creates quite remarkably a sense of greatly increased working space.

Pipes

With pipes rapidly becoming one of the main end-uses of plastics, an extensive pipe-testing programme is carried on by KSPLD. Short and long term test installations, in particular load bursting strength tests (from minutes to years in duration) are used. Some 300 units, fitted with hour counters and pressure recorders, test pipes at various temperatures (up to 95°C.) and pressures. These tests, and others such as exposure under differing conditions, are made with the aim of ensuring that pipes will behave satisfactorily for long periods of time, 50 years or so. It

is of interest to note, incidentally, that in the last five years 4,000km. of rigid PVC pipe have been laid in Holland.

Other work at the laboratory consists of investigations into all types of plastic and rubber foams of both open and closed cell construction.



On the gallery from which this picture of the main machine hall was taken is a wide range of mixing equipment for compounding under varying conditions using different quantities and methods

These include Cariflex SBR latex foam; rigid and flexible PVC foams; polystyrene foams and polyurethane foams.

Work on resins and synthetic rubbers is still being carried on in the buildings of Rubber Stichting, although as space becomes available these departments will be transferred to new buildings (which will include extensions to the plastics laboratory) on the KSPLD site. Present rubber research equipment includes a comprehensive range of mills, extruders, calendering and sheeting rolls and test apparatus. The programme includes the development of new grades of Shell synthetic rubbers and also considerable development work on Epikote resins for end uses ranging from textile finishings to coatings, laminations, potting and adhesives.

Plastics in Construction

An outstanding feature of the new KSPLD laboratory is the extensive use of plastics materials in the construction, finishing and equipment of the building. In fact, plastics have been used wherever their application has been technically and economically justified.

On the exterior of the building their application is apparent in the panels of the curtain walls. These panels are coated on the outside with a polyester resin having a glass fibre filling. Beneath this coating is a phenolic paper laminate 1mm. thick. Since these panels are part of the insulation of the building they incorporate beneath the paper laminate a layer 22mm. thick of polystyrene which has a backing of asbestos cement 13mm. thick. Bonding of the polystyrene foam to the asbestos cement and the paper laminate has been effected with an adhesive incorporating an epoxy base. The steel frame of the curtain wall has been protected with a paint formulated with 'Epikote' resins.

Of particular interest is the construction of the reinforced concrete roof which has been covered in three sections. One section has a conventional covering employing pebbles, gravel, roofing felt and an insulating layer of cellular concrete. Another section has a modification of this formulation in which polystyrene foam replaces the cellular concrete. In the third section plastic materials have been more widely used. The surface is a layer of polyvinylchloride/coal-tar reinforced with glass fibres and covered with aluminized slate chips. No felt is employed, but there are two layers of the above composition, without the slate chips, separated by a layer of polystyrene.

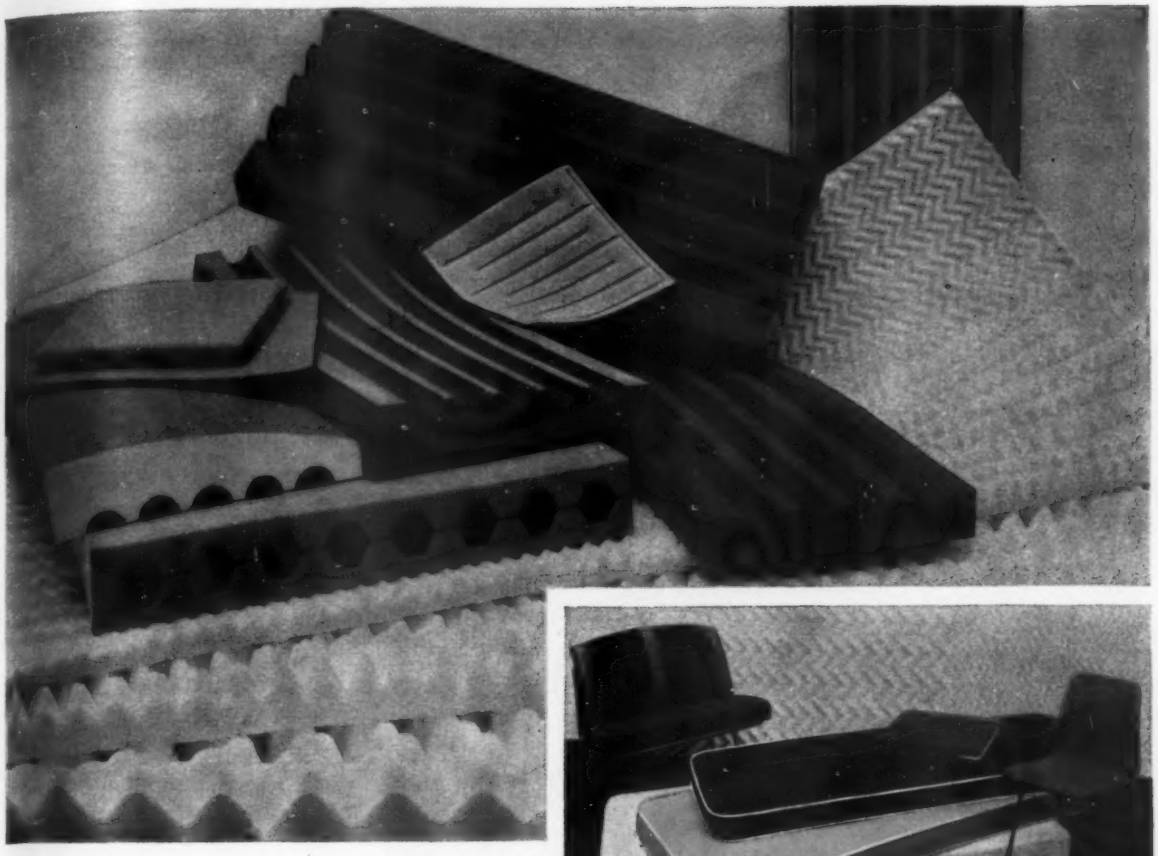
Besides being used on the roof and exterior wall panels, foamed polystyrene is used as acoustic insulation for the floors in the office and laboratory wing of the building. These floors are of floating concrete in which reinforced concrete 4cm. thick floats on a 1.5cm. layer of polystyrene foam supported by a reinforced concrete layer 10cm. thick. Polystyrene tiles are used on the walls in the small kitchen on the ground floor.

Decoration

Plastics have also been widely used for decoration. In the foyer of the building, methacrylate materials have been used extensively to give special lighting effects and contribute to the feeling of spaciousness. The curving balustrade of the stairs is made of these materials and so are the panels in the reception desk and the showcases. The wall decorations are made from PVC tubes and strings; polystyrene tubes; polythene cords and polystyrene and polythene granules embedded in 'Epikote' resin.

Entrance hall to the new laboratories. Plastics were extensively used in construction, finishing and equipment

The floor covering of the offices, the analytical laboratory on the first floor, the testing room and the staircases and corridor is jute-supported PVC. Ground floor laboratories, with the exception of a strip down the



An outstanding
new material

Polyurethane flexible foams

made from ICI ISOCYANATES, POLYESTERS and POLYETHERS
are soft, light, washable and exceptionally hard-wearing. Easily produced in
a wide range of densities, perfectly suited to a host of needs
in soft-furnishing. Ask for details of Suprasec SF, Daltocel PP1 and Daltocel SF
Polyurethane Flexible Foams give greater warmth in quilt-linings and blankets—
and they have luxurious comfort in cushions, pillows and upholstery.
When used in wall-panelling or as carpet underlay they both
conserve heat and deaden sound.
Polyurethane Flexible Foams can be sewn or quilted without difficulty.
They can also be washed or dry-cleaned.

Ⓟ Patented in the main industrial countries

ICI

Enquiries should be addressed to:

ICI Sales Development Department (Polyisocyanates) Ship Canal House King Street Manchester 2

IMPERIAL CHEMICAL INDUSTRIES LIMITED
LONDON SW1 ENGLAND

X 87

centre of each room, have a floor covering of wood parquet protected by an 'Epikote' resin varnish. The centre strip, which has to stand heavy wear, consists of a trowelled layer of solventless 'Epikote' resin flooring composition. Concrete floors in the machine hall and the basement have been treated with an 'Epikote' resin paint. All working surfaces of laboratory benches have been varnished with 'Epikote' resin and the furniture itself is built up of 'Epikote' resin varnished wood and phenol-resin chipboard with thermosetting laminates.

Ventilation ducts for fume cupboards and fume hoods over some machinery are made from rigid PVC. Outside the laboratory the chain-link fence is fabricated from PVC coated wire. The steel railings on the galleries and staircases are also covered with PVC. Rigid pipes fabricated from PVC, in diameters ranging from ½ to 4in., are used for cold water, vacuum, compressed air, nitrogen and, to some extent, for drainage. PVC valves, with polythene plugs, are employed for pipe diameters up to 2in. PVC is used in the insulation of all cables and wiring in the building, and these facilities are installed in rigid PVC conduits. Switches and power points are of urea formaldehyde resin.

Plastics are also used in the hardware on the doors. Handles and finger plates are of amino-plastics moulded over pressed metal inserts. Locks have catches and other working parts of nylon with metal inserts. A thin strip of polyurethane foam has been glued into the corner of each door frame to cushion the impact of the door closing.

Vinyl sheeting and thermosetting resin laminates have been extensively used as wall finishes, and skirting boards in the offices and laboratories are made from PVC.

Plumbing fixtures include, for example, methacrylate wash basins installed in the washrooms and a nylon sink in a small kitchen. The complete arrangement of sinks and drain boards in the glass-washing room is fabricated from rigid PVC as a single unit.

Processing Machinery

Processing machinery plays an essential part in the work of KSPLD, and includes the following: Trudex extruder twin screw 90mm. diameter for compounding and granulating. Reifenhäuser single screw extruder 60mm. diameter for pipes and quenched foil and a similar machine with complete sheet take-off equipment. Frieseke and Hoepffner extruder single screw 45mm. diameter for blown foil and cable covering. Fischer bottle blowing machine. Netstal injection moulding machine, 4oz. Ankerwerk injection moulding machine with screw plastification, 4-5oz. Peco MS 30 normal plunger injection moulding machine (two cylinders 4oz. and 6oz.) and a Peco MP 40 with preplasticizing device, 8oz. shot 30in. x 30in. area. Daniels Latymer vacuum forming machine. Kera drum mixing apparatus. Werner and Pfleiderer Banbury mixer. Prause cable take off with thickness meter and wire preheating. Bridge calender, 4 roll. Bussmann 100 tons press. 8 PHI presses for 50 tons. Troester 2-roll mills, 300 x 700mm., and 100 x 200mm. Fontijne 2-roll mill 75 x 200mm. Schwabenthan 2-roll mill 150 x 350mm. Wiener 3-roll mill for paints. Mapré granulator for strings and band. Lödige mixer (heating and cooling). Henschel mixer (heating and cooling) 100 l. Werner and Pfleiderer 2-blade mixer. Alpine pin mill. Alpine grinding mill. Nauta mixer 100 litre. Drais mixer 20 litre. TP Engineering drum mixer. Buss Ko-Kneader. Hydrochemie sheet tester and Wilh. Hoffmann drying oven 9m.² area.

This excludes the machinery for rubber evaluation.

A section of the mechanical testing laboratory which is fully air-conditioned. The machine on the right is the 'Tri-Plot' apparatus mentioned in the text

IRI Golfing Society

LONDON SOCIETY

THE venue of the Autumn weekend of the London Section of the IRI Golfing Society was Seaford and Blatchington Golf Club, the members being accommodated at the club Dormy House attached. The turnout was a poor one, many of the regular members who support these weekends being unable to come for various reasons.

Under the genial captaincy of Val Jorey, incidentally his last official function as captain, the members present were unanimous in their praise of the course, clubhouse, the Dormy House, but not the weather.

The London Section seems to have been extraordinarily unlucky this season in their weekend meetings. The Sunday of our Spring weekend at Aldeburgh was one of the very few Sundays when we have had any rain this year, the Wallwork Final at Hawkestone was played in a downpour and the Sunday of the Autumn weekend, it is fairly safe to say, was the only Saturday on which rain has fallen for about five months.

So far as the Seaford weekend was concerned, nothing could dampen the spirits of those attending, not even the water, both hot and cold with which the rum and whisky were mixed on their return to the clubhouse, looking like drowned rats.

The weekend was an informal one, devoid of competitions, which innovation seemed to have met with general approval. On Sunday morning the members and their guests journeyed to Highwood, when they played the club and lost by three matches to two in a four-ball.

After the match the Skipper said how much the Society enjoyed meeting the club and mentioned the fact that no doubt it was owing to the absence of several of our regular members that the club were able to beat the Society. At the luncheon which followed, one or two of the members spoke of the enthusiasm which Val Jorey had put into his two years of office as captain, particularly during the 1959 season, although he had been unable, owing to an operation, to play himself.—H. R. C.

Man with a confident look has a face made from the 'Cariflex' latex designed for the manufacture of foam rubber. His air of assurance is shared by manufacturers using 'Cariflex' general purpose rubbers.

Shell has given a new look . . .

to the world's rubber industry, which now demands a greater supply of rubber than natural sources can provide. Man-made rubber, to an ever-increasing extent, is *Shell*-made rubber . . . **Cariflex** General purpose styrene-butadiene rubber, **Cariflex** is manufactured to standard specifications but with the hallmark of quality that distinguishes all things made by Shell. Available in twenty different types of dry rubber and latex, comprising hot and cold polymers, oil master-batches, carbon black masterbatches and hot and cold latices, **Cariflex** is used for many industrial and mechanical products, latex foam, toys, tyres and footwear. Ask your Shell Company for details. *Think from today in terms of* **Cariflex.**

Cariflex
TRADE MARK

SHELL **MADE RUBBER**

Issued by Shell International Chemical Company Limited and Bataafse Internationale Chemie Mij. N.V. For further information consult your Shell Company (in the U.K., apply to Shell Chemical Company Limited).

Advances in Synthetic Rubbers

PI LONDON SECTION MEETING

ON November 3 members of the London Section of the Plastics Institute heard an extremely interesting lecture by Dr W. F. Watson, Director of Research, Research Association of British Rubber Manufacturers, on 'Recent Advances in Synthetic Rubbers.'

Into a broad, and indeed masterly, survey of the subject, Dr Watson condensed a very considerable amount of material. He spoke first of the difficulty of drawing a dividing line between rubbers and plastics and said he had taken as an arbitrary definition that rubber was a polymer which was vulcanized during its processing, that is, cross-linked to the extent of about one cross-link per hundred chain units. Thermoplastics relied for their physical state on the fact that we happened to live at temperatures above those of their glass temperatures and thermosetting resins on cross-linking every one or two chain units.

Cross-linking of rubbers was still usually by the first-discovered agent, sulphur, and accelerators (natural rubber, SBR, nitrile, butyl, etc.). There was, he said, much still to be learnt about the process of cross-linking with sulphur and very active research on cross-linking processes was going on all over the world, distinguished work being done in this country in the Natural Rubber Producers' laboratories. Sulphur was not the only vulcanizing agent and for the newer synthetic rubbers other agents, such as dicumyl peroxide, were more important.

Outlining synthetic rubbers available today, Dr Watson said that the so-called 'synthetic natural' rubber was a polyisoprene predominantly of 1:4 addition with the *cis* configuration at almost all the double bonds identical with the natural material. The difficulty of synthesizing polymers of known stereo-configuration had been achieved by stereospecific catalysis. There were, for instance, the Ziegler catalysts developed in Germany, lithium in the US, and sodium in the USSR. In the USA, the Shell Co. was already marketing 'Synthetic natural' at about the current price of the 'natural.'

The cyclization of natural rubber, and its change in properties, was discussed, and this led to mention of the formation of graft polymers, in particular hybrids of plastics with rubber such as Heveaplus MG, natural rubber with polymethyl methacrylate and the use of mastication as a means of producing block polymers on a large scale.

Styrene - butadiene rubbers (SBR) were becoming increasingly general purpose rubbers. It was possible that natural rubber, from supply and price considerations, would become more and more a premium rubber, used for purposes such as in the gum state where its 'rubberiness' was still pre-eminent. SBR rubbers could be hot or cold polymerized. The latter gave a higher molecular weight with consequent better abrasion resistance and tensile strength and allowed of cheapening by oil extension. Latex masterbatching of carbon black could be expected on a large scale in the near future.

The properties of neoprenes were outlined. Neoprene GN had been developed shortly before the war. It was a copolymer of chloroprene and sulphur with a tendency to crystallize at low temperatures. Copolymers with styrene and neoprene WRT had been developed to overcome this tendency. There were a number of neoprenes all of which, except S which was already cross-linked, could be cured by means of metal oxides. They all showed heat, ozone and oil resistance.

The properties of Hypalon, chlorosulphonated polythene, were also discussed.

Nitrile rubbers, said Dr Watson, had greater oil resistance according to their greater acrylonitrile content (15–40%) but there was then a greater tendency for the polymer to stiffen at low temperatures. The exceptional heat resistance did not seem to depend on chemical resistances of the polymer but to the abnormally enhanced effect of anti-oxidants.

Butyl rubbers, copolymers of isobutene and isoprene, were much used on account of their properties in inner tubes. The popularity of tubeless tyres, however, had affected the position and there was now in progress so much new research for wider uses that we had currently a butyl shortage. Only about 1 to 3% of monomer was isoprene, which gave slow vulcanization but good resistance to oxidation and ozone. New developments included bromination (about 2% incorporated) and chlorination (about 1%) which gave improved vulcanization properties, and the use of Elastopar and heat-treatment for reinforcement by carbon black.

Cis-polybutadiene rubber produced by the Phillips U.S. Company had the immediate attraction of an inexpensive monomer. Independently of Ziegler, this company had developed a stereospecific catalyst system involving chromium oxide. This rubber was more resilient even than natural and was likely to find application in blends with it.

Polyurethane rubbers had been developed mainly in Germany during the war. Polyesters were reacted with di-isocyanate to increase the chain length and provide reaction centres, while further chain extensions could be provided by glycols or water. Extra di-isocyanate produced cross-linking. Their major use at present was as blown foams. The differences between the properties of polyester urethanes and polyether urethanes were described, the latter more approaching natural rubber latex foam.

Dr Watson went on to outline further types of rubber including silicone rubbers, the simplest of these being dimethylsilicone (use range −65 to 250°C.). Phenyl modified rubber (−95 to 180°C.) and vinyl modified rubber (−57 to 200°C.) were among other types some of which could withstand 250°C. After mentioning acrylate rubbers, including the British produced material of this type, Hycar 4021, Dr Watson came to fluorinated rubbers. Several types were now available; all showed extreme resistance to oils and solvents and to many chemical reagents, including rocket fuel, nitric acid and diester lubricants. All were rather expensive. Mentioned were Viton A, Poly FBA and Kel-F elastomer.

Various synthetic rubbers were then compared as to their properties. Although natural rubber was not generally suitable for use above 75°C., it could, by special compounding, be used up to 125°C. For services up to 100–125°C., neoprenes, nitriles or polyurethanes could be used. With no oil present, butyl was also quite resistant to heat ageing. For temperatures up to 150°C., Hypalon or a polyacrylate was required. Above this, silicone rubbers had to be used with a limit of 200–250°C., but oil or steam must be absent. If these latter were present, fluorinated rubbers were needed.

Dr Watson went on to talk of degradation by ageing at various temperatures and in various conditions.

The chairman of the London Section, Dr J. Gadsby, was in the chair. A vote of thanks, proposed by Dr C. L. Child, was heartily accorded by the large number of members present.

Kunststoffe 1959

THIRD REPORT ON DUSSELDORF PLASTICS EXHIBITION

IN the first report on the Dusseldorf Plastics Exhibition details were given of the new Henschel-Prodex 8in. extruder with a screw ratio of 24 to 1. In the second report the Mapré twin-screw extruder was examined, this machine having a screw ratio of approximately 10 to 1. It is therefore perhaps appropriate that in this third report a description is given of an extruder, manufactured by Frieseke and Hoepfner, with an even smaller ratio. The illustration (Fig. 1) shows the complete machine with the control panel in the background. From this the short barrel can easily be seen. A very interesting design of screw is used and it can be seen (Fig. 2) that the design is completely unorthodox. There is, in fact, no real depth to the thread at all and yet the machine is capable of effectively producing with this type of design fairly complicated and heavy section. The profile illustrated (Fig. 3) which is approximately 2in. square in the outside dimensions is typical of what the machine is capable of producing in rigid PVC. Also of interest is the ease with which the front of the barrel and head are moved by means of a trolley which slides into the front of the machine and lifts away the barrel and heating elements completely (Fig. 4).

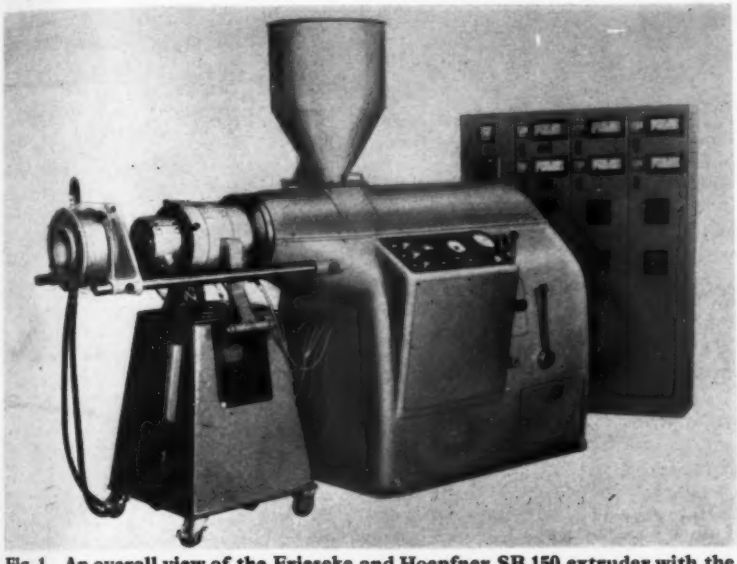


Fig. 1. An overall view of the Frieseke and Hoepfner SB 150 extruder with the instrument panel in the background

This extruder, model No. SB 150 differs considerably from the constructional point of view from other extruders, mainly due to the rigid dimensions of the machine. From tests carried out it appears that the machine operates satisfactorily under all circumstances for which an extruder of these dimensions is qualified to operate. The particular field of application for this plant is in the extrusion of large profiles and heavy sections. The control and regulation of temperature are effected by means of thermo-electric ion-constant on elements working in co-operation with induction regulators giving a very effective form of electronic control of the plant. This perhaps is to be expected from Frieseke and Hoepfner who are, after all, well-known already in the field of electronics.

The diameter of the screw is 150mm. The screw ratio is 3.5 times the diameter. The drive motor is of infinitely variable three-phase type with a speed range of between 600 and 2,200 rpm. Power used is between 2.7 and 11kw. The clutch system is hand-operated and of multiple disc type with a torque equalling 20. The gearing system

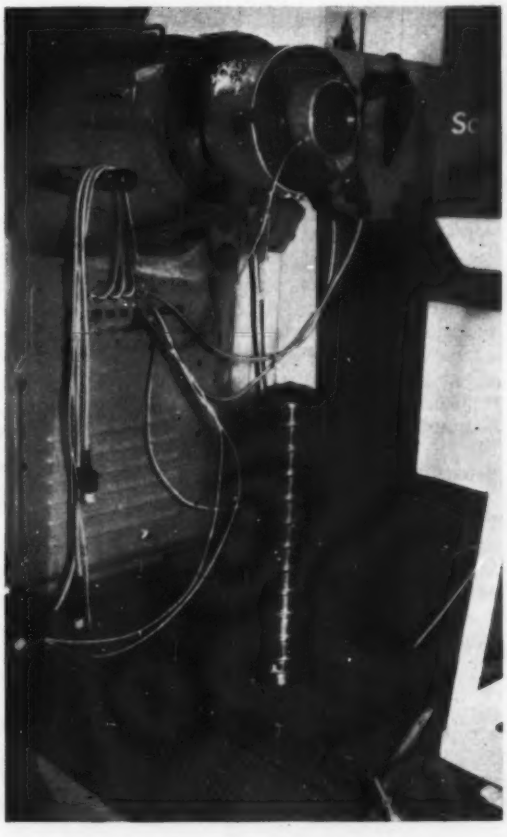


Fig. 2. The unusual design of screw used in the Frieseke and Hoepfner SB 150 extruder. This screw has a 3.5 to 1 ratio and is of shallow thread design

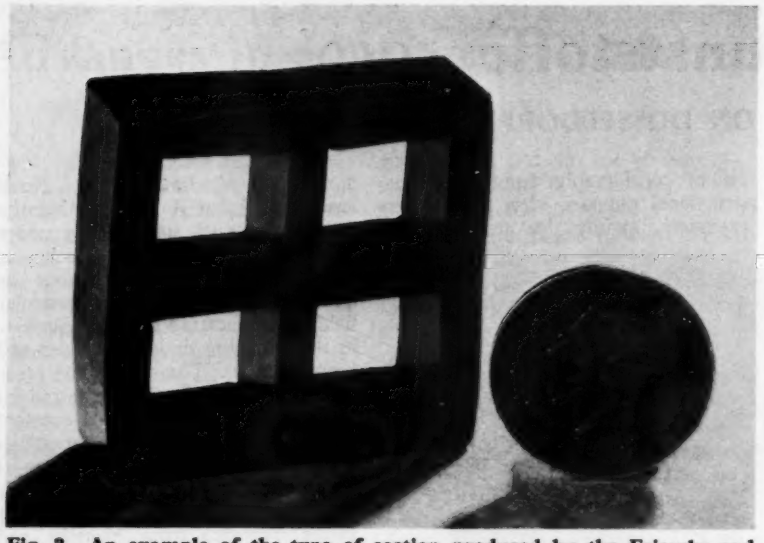


Fig. 3. An example of the type of section produced by the Frieseke and Hoepfner SB 150 extruder. The coin illustrated as a comparison is a penny

which is a solid design operates between a ratio of 85:1 and up to 35:1, according to the type of application.

Heating is through three independent zones, each with a 2,200W heater band. Each zone is cooled by air-cooling using separate blowers of 180W each for each zone. This is a particularly interesting feature of the machine. Also the screw is air-cooled and no doubt with a diameter of 150mm. and with very little depth to the thread on the screw, air-cooling should be very effective. The feed-hopper, however, is water-cooled by a circulation system. The controlling cell is of very interesting electrical design and contains two induction coil regulators with a measuring range of between 20 to 400°C. The controlling device has a sensitivity of ± 0.5% of the length of the scale, two ammeters, two ring regulating transformers, change-over relays, fuses and circuit-breaker. An alternative to the normal system allows for the installation of only one regulating circuit if required.

Interesting feature about this SB 150 extruder for which a German patent has been applied for is that the end user price is considerably less than that of a standard type extruder similar to the models which were, in fact, exhibited on the stand of Frieseke and Hoepfner.

Also on the machinery side of the exhibition was a strand granulator on the stand of Fellner and Ziegler. These designs of granulators are of particular interest to those who require accurate and economical production of granules. A wide range of these granulators is made by this company, the illustrated model SK 60E is a 60-strand (Fig. 5), with an output of two tons per hour, which by any standard is good. These granulators have individual filament guides, each of which is fitted with a spring-loaded pressure roller giving completely free feed of the filament even when there are variations in the strand diameter. Also, there is an infinitely variable feeding speed up to about 58in./sec., therefore allowing very close synchronization to the filament feed. Also, the cutter is able to cut without burr which again is of considerable importance as the cuts are very accurate dimensionally. The spring-loaded pressure rollers are also designed as to give easy accessibility to the cutters and to allow for simple cleaning when required. The model illustrated has been specially manufactured for the Von Kohorn International Corporation of the USA.

Also on the plant side there was exhibited the very large Krauss-Maffei injection moulding machine with screw pre-plasticizing unit, this machine being capable of 4½ lb. (approximately 9¾lb.) shots.

Many stands at this exhibition were devoted to the technical use of plastics in the form of pipe systems and duct work as well as the many applications of a more specialist nature in the chemical industry such as fume-scrubbing plant and special processing vats and containers, etc. In the field of plastic pipe work in particular, much effort has gone into the development of various means of connecting pipe lengths together. A number of companies have developed the technique of expanding under heat a groove in the end of the pipe into which is inserted a sealing ring either made of flexible PVC or neoprene or some other chemically resistant rubber. Into this is inserted the plain end of the connecting tube. This technique is not used a lot in England but from conversations with the

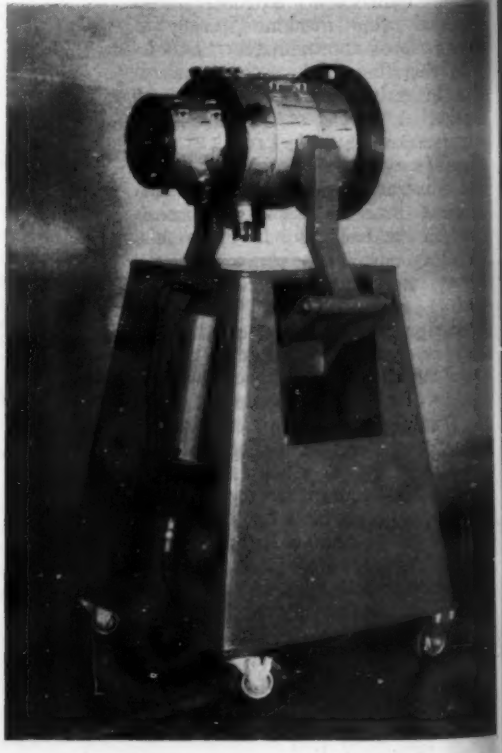
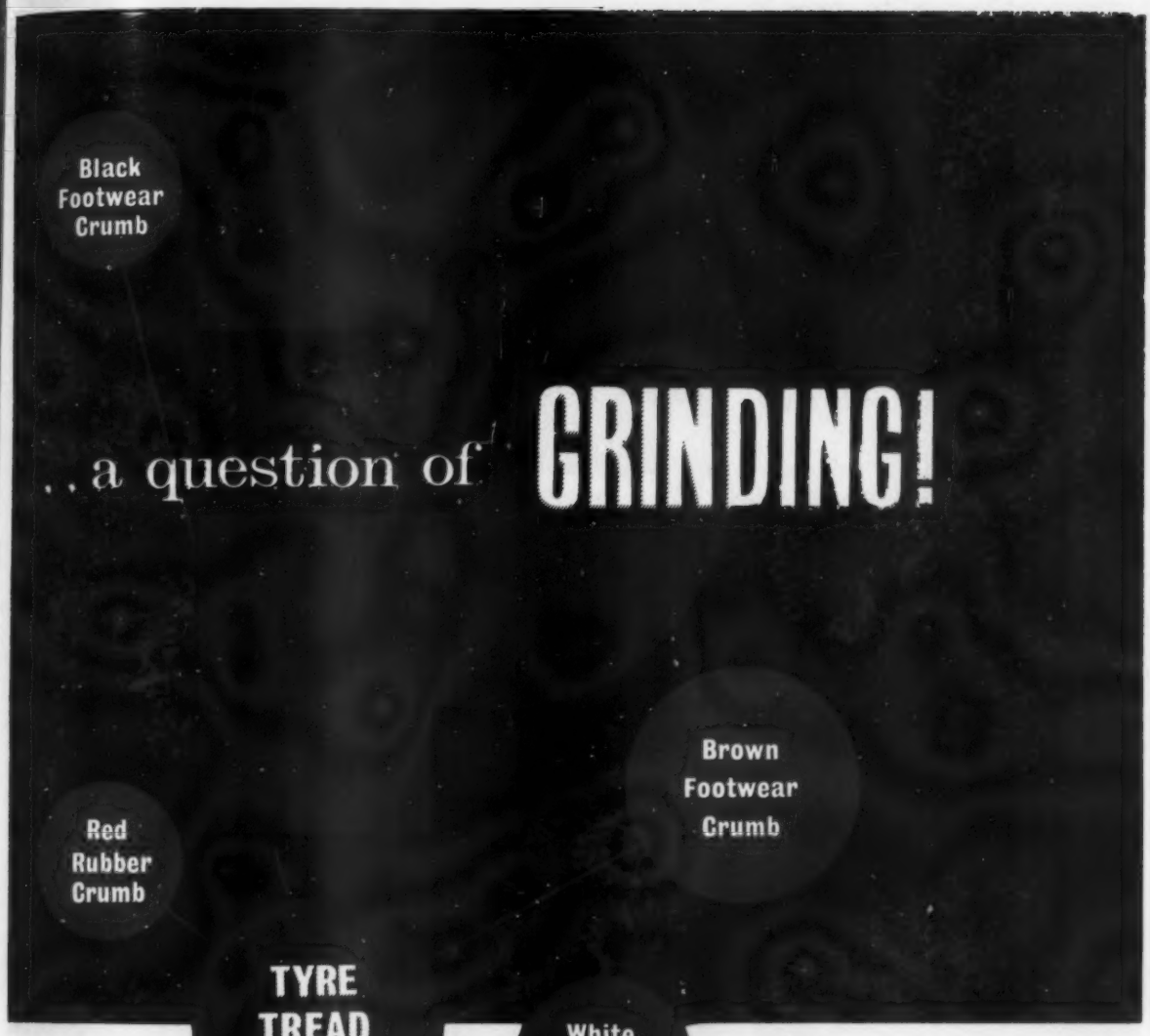


Fig. 4. The extrusion head conveyor trolley for use with the Frieseke and Hoepfner SB 150 extruder



STANDARD MESH SIZES:
18's 20's 24's 30's

. . . and the B.R.R. group have the answers. For over 80 years we have been solving problems of grinding for many well-known manufacturers whose products are household words. A wealth of knowledge and experience is therefore available to you. New laboratories with the very latest equipment back our technical service which is at your disposal.

All enquiries welcomed by :

BRITISH RECOVERED RUBBER AND CHEMICAL COMPANY LIMITED

ASHTON NEW ROAD · CLAYTON · MANCHESTER 11

Telephone : EASt 1406-7-8 *Telegrams: 'Reclaimed' Manchester*

ASSOCIATED COMPANIES

*

JOSEPH ANDERSON & SONS LTD.

*

IRKDALE INDUSTRIES LTD.

BRR

various exhibitors of the process it seems to be already in fairly widespread use on the Continent. One cannot be really certain of the effectiveness of this technique as it is very doubtful if it will ever be used commercially in the UK where, generally speaking, standards and limits for use of plastic materials are more strict than elsewhere in Europe. Also to be seen at a number of stands were various ranges of fittings in polythene which are connected to the tube by means of an electrical element which is moulded into the fitting and in principle is very similar to that originally designed by I.C.I. in England but which never really caught on here.

In larger structures, the Keramchemie stand had a very fine exhibit of an absorption column approximately 12ft. high and 5ft. diameter, entirely made of welded PVC construction and fitted with inspection holes (Fig. 6).

An interesting point about this particular structure was that although the welding techniques appeared to be the same as used here, the diameter of rod is thicker and therefore if laid effectively must give a stronger weld area. Again, looking at this photograph one cannot help but feel that a similar structure made in the UK would have incorporated at least two if not three, flanged sections instead of using slip-bands, the strength of which cannot really be as great as flanged joints, although, of course, the cost will be cheaper. Keramchemie are engaged not only in the plastics field but in the construction of chemical plant from other materials and therefore have been able to use various commercial contacts to introduce similar products but made from plastics, thereby gaining a considerable experience which is not always available to smaller and specialist firms.

A further report of the exhibition will again be given in next week's issue.

Fig. 5. A 60-strand chip cutter, model SK 60 E. Fellner and Ziegler

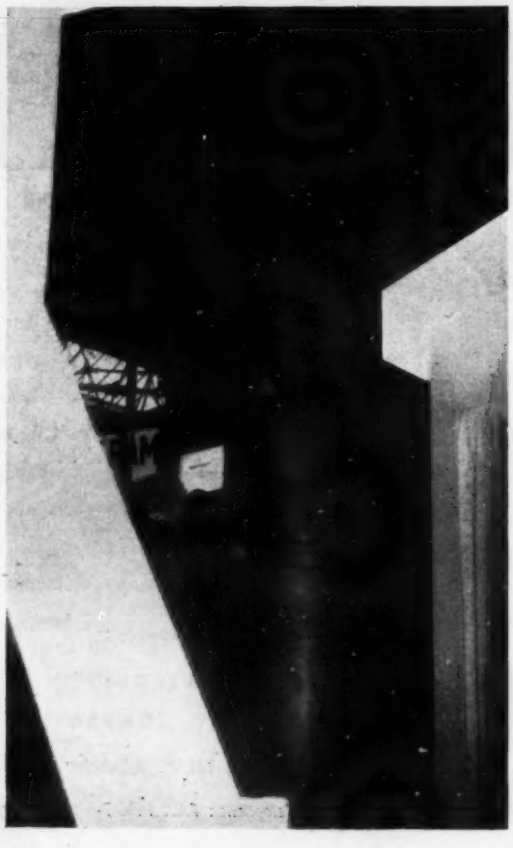


Fig. 6. An interesting example of PVC fabrication is this absorption column 12ft. high by 5ft. in diameter. Keramchemie

Dow British Activities

The British subsidiary of The Dow Chemical Company of Midland, Michigan, USA—Dobeckmun Britain Ltd.—has changed its name to Dow Chemical Company (UK) Ltd., according to an announcement by C. B. Branch, president of Dow Chemical International Ltd., S.A., and manager of Dow overseas operations. The company will continue to handle the manufacture and sale of Lurex, and in addition it will take over direct sales of Dow-produced packaging films such as Trycite, Saran Wrap and polythene film. It will also supervise the sales of Dow US and Canadian-produced industrial chemicals, plastics and magnesium in the United Kingdom.

In the latter line of products, the company will continue to use the services of appointed distributors. R. W. Greeff and Co. Ltd. will continue as principal distributor handling chemicals, coatings, raw materials and magnesium. British Resin Products Ltd. is the distributor for certain plastics moulding materials; and W. J. Fraser and Co. Ltd. for Dowtherm, a heat exchange system. Robert H. Gregory will remain the managing director and a board member of the British company, the address of which is Dow Chemical Company (UK) Ltd., 48 Charles Street, London, W.1.

Robinson Bros. New Plant

Robinson Brothers Ltd., Ryders Green, West Bromwich, are constructing a plant for the manufacture of N-methyl morpholine, the chief use of which is as a catalyst in the manufacture of polyurethane foams. The plant is due to come on stream in March 1960. Samples and specifications are available.

In this case, the thought that the solvent recovery unit installed a year or two ago has already covered its cost and is paying dividends. A Sutcliffe, Speakman recovery plant adsorbs by active carbon valuable solvents which would otherwise be lost by evaporation, and returns them for re-use over and over again. Substantial savings—delighted director.

Capacities range from one gallon to hundreds of gallons per hour. Savings may be a few pounds every week or thousands every year—with no risk! If you use solvents—even on a modest scale—have a word with us about recovery. We will not recommend plant installation unless we are quite satisfied that it will pay for itself—handsomely and soon.

...solvent recovery by SUTCLIFFE SPEAKMAN

SUTCLIFFE, SPEAKMAN & CO. LTD., LEIGH, LANCASHIRE. TEL: LEIGH 94/5/6

London Office: 2 Caxton Street, Westminster, S.W.1. Tel: Abbey 3085

Building Exhibition

RUBBER AND PLASTICS

THE Building Exhibition opened at Olympia, London, on Wednesday November 18. It runs until December 3. Rubber and plastics products are well represented but severe restrictions on space make it impossible to review the exhibition completely.

Six recent products of Semtex Ltd., in addition to the wide range of standard flooring and building products, are on show. Among them is Synthanite, the synthetic anhydrite screeding with excellent non-shrinking qualities for which Semtex have obtained sole distribution rights in this country for floor screeding purposes. Permatred, a rubber material with a tweed design on an embossed surface, suitable for use chiefly as a drugget, is being shown, in addition to Vertilex, Semtex's flexible hygienic wall covering, which comes in a 12-colour range of 1mm. thick vinyl/asbestos tiles.

Three types of deck covering can be seen for the first time at this exhibition. The first, Gripdec, is a balanced blend of chemical rubber, resinous compounds, and non-slip mineral fillers, flexible and immune to the effects of solvents, grease or oil, and is for use on steel, timber or any solid base. Elasdec is a lightweight, waterproof, brush-applied covering based on synthetic rubber and designed for the weatherdecking of small craft, and the third, Semdec, is a substitute for timber decks, non-slip, resilient, and sound-deadening. It is based on neoprene latex with expanded hard rubber insulating slab and reinforcement.

Other exhibits are Semflex tiles, recently chosen for the new American Embassy in Grosvenor Square; Semastic decorative tiles; Vinylex tiles; Dunlop rubber flooring; Surefoot tiles; cork tiles; jointless in-situ latex/cement or resin/cement fleximers; the resin-based floor paint Semguard F; a resin-based non-insulating jointless marine decking Semprene Extra; anti-corrosion bedding and jointing compounds; and polishes and cleaners for use on Semtex flooring materials.

Bakelite Ltd.

The range of Warerite plastics, and their use in the covering and panelling of horizontal and vertical surfaces, are demonstrated on the Bakelite Ltd., 12-18 Grosvenor Square, London, S.W.1, stand at the Building Exhibition. Of particular interest in the Warerite section of the stand is the comprehensive display of 'bespoke' Warerite. This illustrates the way in which different core materials, of varying thickness, such as chipboard, plywood, aluminium, asbestos, foamed PVC and polystyrene, can be faced on one or both sides with Warerite veneers. Also shown in this section are flush doors of blockboard and egg-box construction, examples of post-formed Warerite, and of the many types of currently available edging materials.

The wide usefulness of reinforced Bakelite polyester resin in the building industry is demonstrated by a variety of articles produced from this material, ranging from a flooring composed of a polyester-resin-bonded granite aggregate (Balastic Ltd.) to a virtually indestructible road sign, in which the colours are permanently set into the plastics (Glasdon Laminates Ltd.). This display will include a section of imitation random rubble wall and several decorative panels (A. H. Butcher and Sons Ltd.) and rooflight sheeting (Cascelloid, Division of British Xylonite Co. Ltd.).

Incorporated in the Bakelite stand is a display of phenolic foam core materials for lightweight building panels. The exhibits include building panels of sandwich structure incorporating phenolic foam cores of standard density (4lb./cu. ft.) faced with pastel-coloured polyester-resin/glass-fibre sheeting (Cascelloid), Warerite veneers, and Stelvetite PVC covered metal sheet (John Summers and Sons Ltd.). Phenolic foam core material can be produced in a range of densities from 1lb./cu. ft. upwards, and is easily sawn, when assembling panels, by conventional techniques. The panels possess excellent thermal insulation properties.

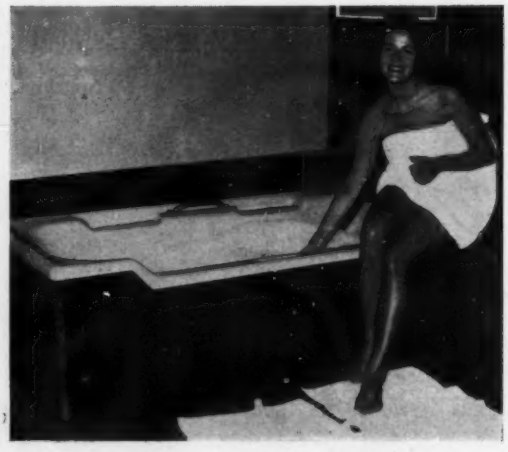
Bakelite epoxide resin, suitably compounded, is used by builders for many of the commoner repairs, and the renovation of stairs and masonry with epoxide preparations is shown on a cutaway stair section (The Safety Tread Ltd.). Chemically resistant flooring and non-skid surfacing based on Permagile epoxide alloy (Surfex Flooring Co. Ltd.) are displayed. The treads of the functional stairs on the stand have also been surfaced with this material.

The use of film made from Bakelite polythene as a protective covering during building construction and repair is demonstrated in such applications as temporary glazing and storage covers. Domestic cold-water piping made from Bakelite polythene to BS 1972 and 1973, and Vybak PVC sealing strips for windows and curtain wall fittings (Plasticable Ltd.) are also displayed.

Dexion Ltd.

A new glass-fibre dome for roof lighting can be seen on the stand of the Plastics Division of Dexion Ltd., Maylands Avenue, Hemel Hempstead, Herts. The domes are known as Dexion Domelights and are made of plastic reinforced glass-fibre in a wide range of standard sizes. Other sizes will be made to order with practically no restriction on size. They will be made clear or diffused, natural or coloured, and will be available with smooth or rough interiors.

Full production will start early in 1960, but prices, samples and quotations are available at the exhibition. Also on show will be Dexion Rooflights, made of corrugated glass-fibre reinforced plastic, for economical roof lighting.



Colourful 'Perspex' baths were prominently featured at an I.C.I. Plastics Division exhibition—entitled 'Plastics in Building'—which was held at the Grand Hotel, Manchester, recently. Since the proof of the pudding is in the eating, I.C.I. invited 18-year-old Miss Valerie Martin—Miss Great Britain 1959—to try out one of the 'Perspex' baths

USE BRITISH MADE RESINS FOR RUBBER REINFORCING

TRED

FOR RESIN RUBBER SOLES, Tred—Monsanto's styrene butadiene copolymer.

Tred is sold in two forms—Tred 50 (crumb form) and Tred 85 (free flowing dustless powder).

Write for more information

Tred is a Registered Trade Mark

MONSANTO CHEMICALS HELP INDUSTRY —TO BRING A BETTER FUTURE CLOSER

MONSANTO CHEMICALS LIMITED

526 Monsanto House, Victoria St., London, S.W.1 and at Royal Exchange, Manchester, 2

In association with: Monsanto Chemical Company, St. Louis, U.S.A. Monsanto Canada Ltd., Montreal. Monsanto Chemicals (Australia) Ltd., Melbourne. Monsanto Chemicals of India Private Ltd, Bombay. Representatives in the worlds principal cities

Monsanto

Regd.

VIEWS *and* REVIEWS

Palmam qui meruit ferat

THE following is quoted from *Rubber Chemistry and Technology* (vol. xxxii, 3, 1959):

'*Soviet Rubber Technology*. A cover-to-cover translation of the monthly *Kauchuk i Rezina* (Raw Rubber and Compounded or Cured Rubber), a periodical of the State Committee on Chemistry of the USSR Council of Ministers. The translating and publishing are under the auspices of the Department of Scientific and Industrial Research Translations Unit, and in collaboration with Maclaren and Sons Ltd., Maclaren House, 131 Great Suffolk Street, London, S.E.1, England, by the Research Association of British Rubber Manufacturers. Price per year in USA, $50.00. The Foreword by W. F. Watson in the first issue states:

'"The emergence of the Soviet Union as a first-class scientific power and as a prolific source of original literature has posed a serious problem to the Western nations in that comparatively few of their nationals can read Russian, and it is, therefore, very difficult for them to follow technical progress being made there. In particular, it has been obvious in recent years that Soviet rubber technology and research is very vigorous and highly advanced.

'"It will be our aim to follow up this issue by translating each number of the Russian original, as it appears, with the minimum of delay, in a dignified, readable, and technically sound version, and to make it available at a reasonable price to the Western world. No doubt there will be difficulties but these must be overcome, as we cannot afford to remain in even partial ignorance of what is being done in technology in the Soviet Union.

'"The translator and editor, Mr M. Lambert, is on the staff of the Research Association of British Rubber Manufacturers."'

From what I have seen, I quite agree as to the importance of this publication.

The BRPRA Technical Service

'It is in the producer's interest to back his sales with technical advice on how his product is to be used.' This is the first sentence in the *Planters' Bulletin* editorial for November 1959. 'It follows that the development of an adequate advisory service to the consumer is of special importance to us in a period when natural rubber has to compete with standardized synthetic products which are supported by efficient technical advice.'

The research and development organizations—particularly the BRPRA and the NRDB—have become increasingly aware during the past few years of the need for such a service, and the point is that they are now in a position to give it.

One feels that the researches of the past, valuable as they may have been, did not—partly in view of the lack of competition—have the 'bite' that they have today, when the full value of the service is beginning to appear.

The campaign to promote the use of SP rubber is, for example, valuable because it exemplifies a state of affairs as well as a fact. One felt that the work of the past had come almost to a full stop. It is as though the research workers had awakened from a long sleep, and the interest in improved resistance to heat and to ozone; the work—and meaning of the work—on crystallization, the investigation of deterioration, of graft polymers, etc., etc., opened up fields which, but a few years ago had seemed impossible.

One begins to see daylight in the fight for natural rubber in its own right—quite apart from the value of *replanting* with high-yielding stock—the main saver.

Australian Plastics

Under 'Comment'—the equivalent of the editorial—there appears in *Australian Plastics* (of Vol. 15, No. 168) the following:

'There are encouraging signs that the *Plastics* industry is evolving to a new maturity of outlook.

'We can now look back on the time when the industry, with all the impetuosity of extreme youth, loudly declaimed that it must have done with the conventional materials, such as leather, rubber, glass, and even timber and metals, and turn to plastics exclusively.

'The folly of this attitude is now all too clear. The surprising thing is that purchasers, lured into buying unsatisfactory plastics articles by their low price or gaudy colour, did not react more strongly away from all plastics articles, and look back towards tried-and-true conventional materials.

'This, however, did not happen, and it now seems certain that it never will. The plastics industry seems now to have recognized that it must utilize the excellent intrinsic properties of its materials, that these materials can often best be used in conjunction with existing materials (vinyl-coated steel, plastics shoes with canvas insoles), and that sound technology and quality control come before, not after, high pressure salesmanship.'

And if anyone doubts what plastics means to Australian industry, let him read the first sentence of his short introduction to his article on the *Next Ten Years in Plastics*, by Karl Sorensen, President, NSW, Section PIA. He says:

'During the past decade plastics have invaded all our homes and entered all our industries. Today, the £30,000,000 outlook of the plastics industry places it foremost in post-war industry development in Australia.'

Coming of Age

The *21st Annual Report* of the British Rubber Producers' Research Association lies before me. I will leave it to others—as I have more than enough material to digest in Part II of the *Directors' Report on Scientific and Technological Studies* to leave Part I—the lucid and interesting *Introduction* on The Objectives of Research—

COMMENT ON SCIENTIFIC AND INDUSTRIAL MATTERS

by **DR SCHIDROWITZ**

by Dr Bateman to others, and to confine myself as said to Part II.

Biochemical Studies

Investigations into the non-rubber constituents of latex have revealed the presence of several types of compound of biochemical or technological significance which have not previously been detected in latex. Two such compounds are adenosine diphosphate and adenosine triphosphate which play a *fundamental role* in the metabolism of living systems.

Most of the biochemical problems so far studied at Welwyn have involved the use of specially prepared deep-freeze dried fractions of latex, provided by the RRIM. Further investigations, however, require direct access to the living plant material, and a tropical glasshouse has been erected adjacent to the BRPRA laboratories. The house is 25ft. high and has a main centre bed capable of taking five trees. By the sides of the main bed there is accommodation for another seven or eight trees, and a large number of young seedlings. Soil warming cables are laid in the main bed, and the temperature of the soil is controlled automatically, as are also the air temperature and humidity. After consultation with the RRIM various clones have been planted and are growing satisfactorily. (*Further details cf. original.*)

Chemistry of Vulcanization

After explaining the important work on the *Chemistry of Sulphur Vulcanization*, and *New Methods of Vulcanization*, which are based on the marked influence of network structure on the oxidative ageing of conventional vulcanizates, the search for alternative ways of forming natural rubber networks of novel and desirable characteristics is explained. Three new vulcanizing methods are being evaluated in which the cross-links and other network modifications differ markedly from the conventional. The first common requirement was to introduce suitable reactive chemical groups into the rubber molecule; this has been effected by treatment with perbenzoic acid, monochlorothiolavetic acid, and ethyl thio-glycollate, all three reactions proceeding most efficiently in latex. All the products are rubber-like. Small scale technological vulcanization from II and III [I has not been found technologically applicable] are described.

I must pass over the important work on ' Fundamental Chemistry of Oxidative Ageing,' and refer only very briefly to ' Stress Relaxation Studies,' a technique which continues to be applied in two main directions; (a) to determine changes in network structure which occur as a result of the thermal and photochemical oxidative degradation of rubber vulcanizates; and (b) to screen materials which protect rubber against such degradation. It is desired to call attention to the simple and accurate stress relaxometer designed at the BRPRA which is illustrated on p. 35.

Rupture Behaviour

A detailed examination of the breaking of rubbers in extension has shown that tensile rupture varies with rate of extension and temperature very much as does tear strength. Thus, the TS of rubbers which are not reinforced either by crystallites or fillers increase with an increase in rate of extension or a decrease in temperature, and the large increase in TS due to reinforcing fillers is restricted to a limited range of rates of temperature. The recognition of the importance of the roughness tip of a tear has been observed.

Tyre Wear

Recognition that the basic physical process in tyre wear is the scrubbing of the tread on the road surface as the rubber snaps back from a highly deformed state, has attracted attention to the reaction of rubber under conditions of high strains and high speeds, a subject on which information is almost entirely lacking. Experiments designed to partly remedy this deficiency have revealed differences in the behaviour of different types of rubber which could not have been predicted from conventional determinations of resiliency.

Laboratory studies of tyre wear have revealed that in addition to abrasion resistance, two further factors influence the wear characteristics, *viz.*, the propensity of the tread compound for forming abrasion patterns, and the mechanical hysteresis of the tyre. Since tyre wear occurs almost entirely when the wheels slip, during accelerating, braking or cornering, the influence of hysteresis has been deduced from the behaviour of slipping wheels. Theory predicts that wear will decrease with increasing hysteresis of the wheel, and this has been verified in a model with small, solid wheels.

Conditions are more complicated with tyres because their deformations are only partially determined by the tread compound, and also because of heating during service.

To examine the effect of these and other variables on wear on the road an experimental trailer has been designed and brought into service to allow tyre wear to be measured under a number of carefully controlled conditions. Initial experiments have been concerned with a comparison between ' factory produced ' NR and synthetic SBR tyres. Pronounced effects of temperature and wetness on the road on the absolute rates of wear, and on the relative ratings have been observed. With both sets of tyres, wear increases with increasing temperature and decreases with increasing wetness—these effects being greater with the natural than with the synthetic tyres. In consequence—under the conditions of the extreme severity of these experiments—the wear ranking of the two rubbers reverses from superiority of the synthetic tread, on hot dry roads, to superiority of the NR tread on cool, wet roads.

I propose to conclude my survey of this interesting report on another occasion.

PHILIP SCHIDROWITZ

Rubber Manufacturers Fined

The United States Rubber Manufacturers' Association and ten of its members, including three of the country's largest manufacturers and distributors of rubber products, have been fined a total of 177,500 dollars for violating the Sherman Anti-Trust Act. The indictment charged that the defendants had conspired in unreasonable restraint of trade to fix prices in the flat belting industry.

Questions Corner—92

(Second Series)

387. What is a good test for completeness of cure when using urea-formaldehyde resins for wet strengthening of paper?

388. Melamine resins may be used in combination with alkyds. For what purpose?

389. Give a general account of the production of urethane foams.

390. One type of welding used in the plastics industry is known as the hot-gas welding process. Give some details.

(Answers next week)

Answers to Questions Corner—91

383. Differences in physical properties, melt viscosity, liability to oxidation are three of the important factors that need to be considered in hot-gas welding of thermoplastic materials.

In welding polyvinyl chloride compressed air is quite suitable and the temperature should be in the region of 270°C., with air pressure of about 5 psi. The amount of heat supplied to the weld can be controlled by varying the distance between the tip of the gun and the weld.

Polypropylene is easily welded with a temperature in the region of 200°C. in the weld bed.

Polythene melts at around 110°C. and burns at about 400°C. and oxidizes rapidly at about 260°C. Nitrogen is the preferred gas to use. If the temperature is too high the rod becomes liquid and little pressure can be exerted on the weld bed.

Acrylics can also be welded but, due to the higher softening point, higher gun temperatures are required. Plasticized filler rods have been used containing about 10% dibutyl phthalate. Compressed air or nitrogen can be used.

384. It has been shown, as a result of experience, that polythene sprayed coatings are better than polythene tank linings where the liner is only partially held to the metal. This is because the differential expansion of the metal and the polythene liner causes buckling and rupture of the liner. Sprayed coatings do not suffer from this disadvantage.

In addition, the covering of complicated surfaces is possible with the sprayed coating technique. It is cheaper to install a polythene-coated mild steel tank than a stainless steel one.

Powdered polythene of melt index 20 is usually used for spraying and the specified range of particle size is:

Screen size.	*Percentage of powder passing.*
44	100
100	60

It is necessary to keep within these limits so that the powder will flow through either a pressure or suction-fed system.

Polythene of melt index 20 is better than one of a high melt index because the lower viscosity of the molten polymer of this type improves fusing after powder spraying.

Products to be completely coated need surface degreasing only, but for other products sand or grit blasting is usual and the adhesion of the sprayed coating will depend on the type of surface finish given. Steel grit 24-40 gives good results.

Coatings on aluminium usually adhere better than on mild steel. The addition of a small percentage of anatase titanium dioxide to the polythene is stated to increase the adhesion of the coating at temperatures below 218°C. on the initial pre-heat treatment (BP 750,645).

There are three methods of spraying polythene:

a. *Powder spraying.*—The choice of this method depends on the size of the article to be coated. It may be more economical to coat by dipping, or may be too large for an oven.

The object is heated to a temperature slightly higher than the melting point of the polymer and then the powdered polythene is sprinkled on to the object. Excess powder is removed by blowing off and then the whole is reheated to fuse the coating.

b. *Flame spraying.*—This method is only used for very large objects. There are two types of gun, *viz.*, induction fed and pressure fed. The latter is more accurately controlled. Fuel gases are used, *e.g.* propane, acetylene, coal-gas. It is usually necessary to pre-heat the surface before coating so as to drive off all the moisture. It also improves the adhesion.

c. *Dispersion spraying.*—Polythene dispersions can be prepared by dissolving the polymer in a suitable hot solvent, *e.g.* trichlorethylene, and adding an alcohol, in which the polymer is insoluble at room temperature. The polythene is precipitated in a finely divided form, remaining in suspension. It is used in this form.

Very thin homogenous coatings can be applied with this method. The ratio of solvent to alcohol partly determines the viscosity. The polythene concentration is usually about 25%.

d. *Electrostatic precipitation* is disclosed in BP 746,179 and may well be suitable for continuous production.

385. There are several factors which can result in faulty welds of thermoplastic materials when using the hot-gas welding technique.

Firstly, overheating breaks down the plastic material and brown coloration is an indication of this. If the filler rod is too hot, the central core becomes too soft and control of pressure and manipulation of the rod is difficult.

Alternatively, if the filler rod is not hot enough it will not conform to the shape of the join. Stretching of the filler rod by forcing it into the weld bed faster than the temperature permits, results in variable rod distortion and variable stresses which, when recovered, can cause cracking of the weld.

386. There are a number of different types of weld, and the correct one to use depends on the type of load to be experienced, the manner in which the load is applied and the cost.

Square butt welds are used when relatively thin sheets of about ⅛in. are joined. The edges are not chamfered or bevelled. The sheets to be joined are clamped to a flat surface during the process.

Single-V butt welds are used for sheet up to ¼in. thick but Double-V butt welds are preferred as this type gives a stronger joint. The edges of the sheets are bevelled to an angle of 60°.

Corner welds are used when two sheets are welded at an angle of 90°. It is only necessary to square the edges of the sheets.

Lap welds are used with thin sheets, and in such cases an overlap of at least ¼in. should be allowed. The nozzle of the gun is flattened to allow heating of both surfaces. It is important to see that the surfaces of the sheets are clean.

Strip welds are sometimes used to reinforce butt welds on thin sheets, but the crown of the butt must first be removed.

Other types of welds are merely variations on these main types.

(More questions next week)

'Atomic weight? That's the count-down period before a nuclear explosion'

NOW Stearex Beads

News for the rubber industry! Stearic Acid is now available in 'bead' form. Made by Price's for Columbian International, STEAREX beads possess unique advantages over other forms of Stearic Acid—at no increase in cost.

- Beads flow freely—are ideal for fluidised handling
- Beads are resistant to oxidation—are more stable than liquid Stearic Acid
- Beads do not 'dust' in the same way as powder
- Beads are less liable to cake on storage
- Beads have a constant weight/volume ratio — make measuring easier

And behind these advantages lie the technical skill and rigid quality control always exercised by Price's (Bromborough) Ltd.

Why not use STEAREX beads in your factory—you can only gain by it.

COLUMBIAN INTERNATIONAL (Great Britain) LIMITED

116 CANNON STREET, LONDON, E.C.4. Telephone: MANsion House 6277 (PBE). Telegrams: NOIRCEUR LONDON

Sole selling agents to the rubber industry for

PRICE'S (Bromborough) LTD., Bromborough Pool, New Ferry, near Birkenhead

MEN and MATTERS

A Review of People and Events

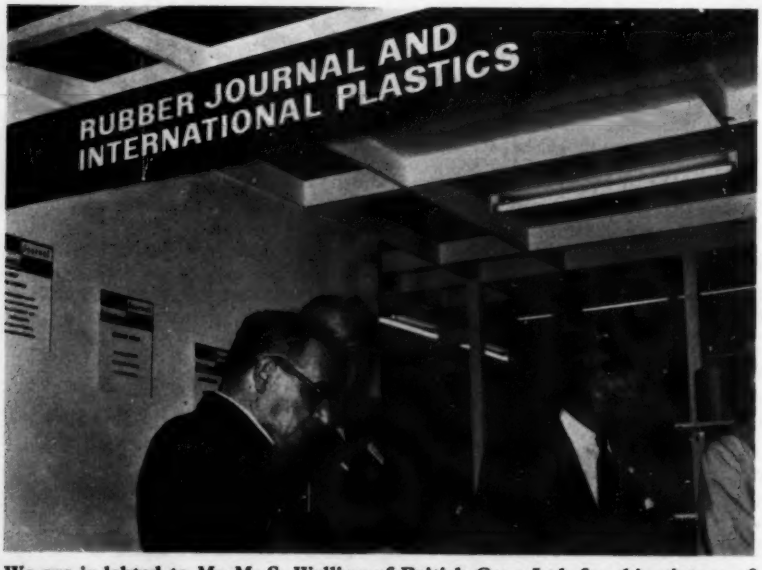
by George A. Greenwood

WHEN the wheel of events turns full cycle especially in politics, the result can be ruthless. At least half a dozen M.P.s who lost their seats at the General Election know that very well. One of them, a former Junior Minister, is on the dole, but I can report a better fate for another of them, Mr Denis Howell, the former Member for All Saints', Birmingham, one of the ablest of the younger men who formerly sat on the Opposition benches.

It is a gesture, indeed, from a well-known Birmingham plastics company, The Co-Ordinators Service (Engineering) Ltd., of Great Barr. This company has given Mr Howell a post of an administrative nature, which will enable him to have sufficient time at his disposal to continue his public and political work. He has recently been serving on the committee presided over by the Countess of Albemarle which is investigating youth services, and he is also a member of several other national and local commissions and committees. To his earlier knowledge of engineering, gained before he went into Parliament, Mr Howell will now add a further knowledge of industrial plastics, but whether he will go into this is a matter still to be determined. All he will say at the moment is that 'the scope of this company interests me very considerably.' But he will continue to function as a first-class football referee!

Although not actually in either the chemical or plastics industries, Dr H. R. Ambler, for several years now assistant director of the Ministry of Supply's Chemical Inspectorate at Woolwich, is one of the best-known men within them. All his friends, therefore, will be interested in his appointment to the newly-created post of scientific adviser to the United Kingdom High Commissioner in New Delhi. He will be leaving for India, with which he is already familiar, having spent seven years there quite a while ago, very soon.

There, he will also be responsible for furthering the exchange of information between British and Indian scientists, a job which is bound to enable him to retain some of his old contacts with industry. Dr Ambler, a Londoner of Yorkshire descent, I gather, is 58.



We are indebted to Mr M. S. Welling of British Geon Ltd. for this picture of the RJIP stand on the combined British stand of the BPF at the Dusseldorf Plastics Exhibition. It shows (*left to right*) **Mr C. H. Glassey, chairman of British Industrial Plastics Ltd. and president of the British Plastics Federation; Mr C. B. Copeman, chairman of Maclaren & Sons Ltd., proprietors of RJIP; and Mr H. A. Brooks, British Industrial Plastics Ltd.**

A Retirement

It is announced that Sir Walter Worboys has resigned from the board of I.C.I., his retirement having taken effect at the end of October. The announcement created some interest and speculation. In the middle of the year, when changes in the I.C.I. directorate were announced, it was stated that Sir Walter would, at his request, be relieved of his duties later in the year, the reason given being that he wanted more time to devote to his other numerous industrial and commercial interests.

At I.C.I. he was, of course, commercial director, but he is also on the boards of the Westminster Bank and the Westminster Foreign Bank and other companies, and has for years been a leading figure in the affairs of the Council of Industrial Design, as its chairman.

A Matter of Cables

Not for a long time have cables, and the cable industry, been so much in the news. Not the least interesting of all the items is the announcement that the Pacific link between Australasia and Canada of the Round-the-Commonwealth submarine telephone cable is now planned to be completed in 1964. From Canada the cable will go to New Zealand and thence to Australia. When the whole scheme is completed the total cost will have been anything between £70,000,000 and £80,000,000.

Birth of An Industry

The first recorded sales of polythene in the world (the total sales for 1937 were 20lb.) were noted by a young I.C.I. research chemist. An interesting page of his notebook, which came to light recently among old research files, is shown in the photograph (page 648). The chemist —Mr E. G. Williams, one of the I.C.I. Alkali Division team to discover polythene—is now joint managing director of I.C.I. Plastics Division.

Among the entries he made is one which refers to Submarine Cables Ltd. The 'J. Dean' entered beside

Noury

Serving the Plastics Industry

with the widest range of ORGANIC PEROXIDES

for polymerisation of polyester and

other synthetic resins

DI-TERTIARY BUTYL DIPERPHTHALATE

PARA-MENTHANE HYDROPEROXIDE

2,4 DI-CHLORO BENZOYL PEROXIDE

METHYL ETHYL KETONE PEROXIDE

DI-TERTIARY BUTYL PEROXIDE

CUMENE HYDROPEROXIDE

DICUMYL PEROXIDE

BENZOYL PEROXIDE

2,2 BIS (TERTIARY BUTYL PEROXY) BUTANE

METHYL ISOBUTYL KETONE PEROXIDE

TERTIARY BUTYL HYDROPEROXIDE

PARA-CHLORO BENZOYL PEROXIDE

TERTIARY BUTYL PERBENZOATE

TERTIARY BUTYL PERACETATE

CYCLOHEXANONE PEROXIDE

LAUROYL PEROXIDE

Others in course of development

Also stabilisers for use in P.V.C. and other halogenated compounds

BARIUM/CADMIUM LAURATE

EPOXIDISED VEGETABLE OIL

DIBASIC LEAD PHOSPHITE

TRIBASIC LEAD SULPHATE

DIBASIC LEAD STEARATE

BASIC LEAD CARBONATE

LEAD STEARATE

LEAD SILICATE

Others in course of development

NOVADEL LTD.

LUCIDOL PRODUCTS DIVISION

ST. ANN'S CRESCENT, LONDON, S.W.18 Works: GILLINGHAM, Kent

the company's name is now Sir John Dean, chairman of the Telegraph Construction and Maintenance Co. Ltd., one of the parent companies of Submarine Cables Ltd. From the early days, Sir John has been closely associated with the development of polythene for both radar and submarine cables.

Total world sales of polythene are expected to be around 700,000 tons this year, of which about 90% will be made by the original high pressure process.

Appointment

Mr Donald J. Flatman, F.R.S.A., M.Inst.Pkg., has recently joined the staff of Anglo-American Plastics Ltd., a member of the Commercial Plastics Group. Mr Flatman, who is a packaging specialist will be concerned with the development of new outlets for the company's products. Since 1940 he has been with the Nestle company. He became a member of the Institute of Packaging in 1950, and as chairman of the Education Committee of the Southern Area is responsible for the organization of the Institutes lecture courses in this region. The session 1959-60 is the third for which he has been responsible. Mr Flatman is also a member of the Institute of Materials Handling.

D. J. FLATMAN

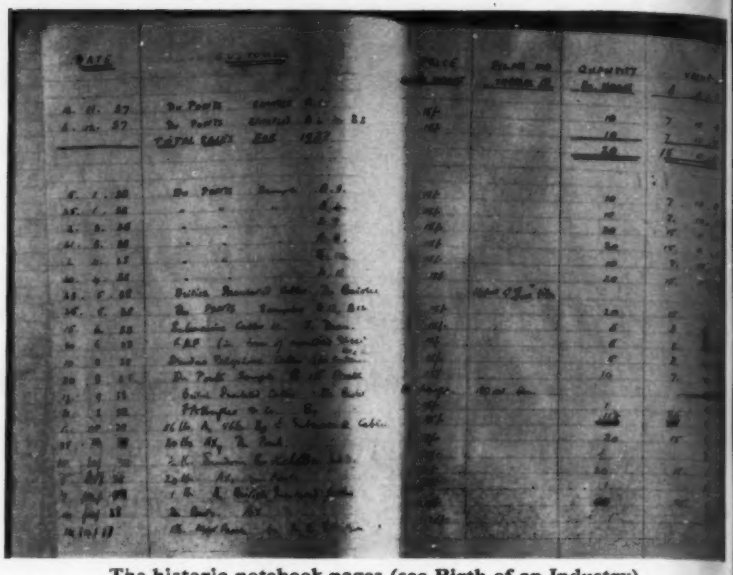
A Dunlop Development

Following true to its record of experiment and advancement, the Dunlop organization, through Dunlop Footwear, is spending £150,000 on making larger its new factory at Walton to embrace increased production of directly moulded footwear, and also standard lines.

A new technical centre is being established in which will be concentrated long-term development projects, with pilot plants for the evaluation of new ideas and processes on a semi-production scale. New synthetic materials will be investigated to determine their ultimate use in footwear manufacture, and the improvement of existing materials and techniques.

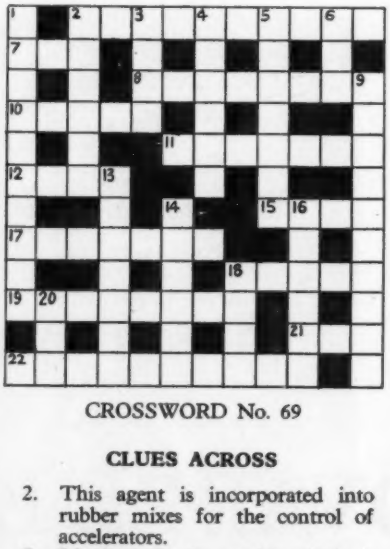
Into the bargain, long-term projects include a new process for direct vulcanization of microcellular rubber to both leather and canvas uppers, which is now being completed. Another project, the production of a cellular insole material by means of a continuous manufacturing process is nearing completion.

But, as a matter of fact, the application of rubber to all kinds of wearing apparel, and especially to footwear, is expanding everywhere. Not so long ago Mr Peter Pettit, the chairman of Phillips' Rubber Soles, told me that a marked improvement in current demand followed upon a general trend, and it would be an even more attractive picture that he could paint if the export market had kept up with home demand for soles and heels.



The historic notebook pages (see Birth of an Industry)

RJIP CROSSWORD



CROSSWORD No. 69

CLUES ACROSS

2. This agent is incorporated into rubber mixes for the control of accelerators.
7. It's fresh at the seaside which is a change for the IRA.
8. In coal mines this should be fire-resistant.
10. Ghosts do, so have a hunt again.
11. Upholstery.
12. A knowing dig.
15. A confused lyric gives the name away.
17. Latex is another cold oil.
18. This country ends with a wager.
19. Accelerator of mastication.
21. Make a mistake.
22. A pretty wire may be composed on this machine.

CLUES DOWN

1. Rubber protector for locks (7,3).
2. Not quite there but generally paid for in the 'local.'
3. Not a virtue of the outspoken.
4. This sailor is not good at the beginning or at the end either.
5. When organizations hold one it does not necessarily mean they're closed at night (4,3).
6. Wow! As the pidgeons say.
9. Glue or tars are mixed and used in polymerization.
13. This is driven off on course (4,3).
14. The romancer includes the SS.
16. Eraser.
18. Run leisurely and have nonsense finally.
20. The isle can be another lye.

(Solution appears on page 660)

BRPRA Research Progress

ANNUAL REPORT

IN his annual report for 1958, Dr L. Bateman, director of research of the British Rubber Producers' Research Association, comments on the difficulty of reporting on research projects which seldom start and progress evenly in 12-month stages, convenient for annual review. The association's programme, however, is well covered in the report, and a number of items of considerable interest are included. In his introduction (section 1 of the report) Dr Bateman states that the objectives of the association's present programme are: 1. To determine the nature and significance, technological and biological, of the non-rubber composition of latex; 2. To reveal the scientific principles underlying the important rubber processing procedures such as mastication, mixing and vulcanization; 3. To understand and control the deterioration induced or stimulated by oxidation or ozonolysis and manifest by cracking, tearing and elastic failure generally; 4. To seek improvements in natural rubber and its compounds for particular service conditions or applications; 5. To explore and develop new or extended uses of rubber; 6. To provide a technical service which will help the competitive position of natural rubber. An explanation of how research is being conducted to achieve these objectives is given in the introduction.

Chemistry of Sulphur Vulcanization

Of particular interest is a description of the progress which has been made towards resolving the chemical reactions involved in the vulcanization of rubbers and the structures of the vulcanizates produced by various vulcanizing agents.

The former information is important for understanding why accelerators and auxiliary vulcanizing agents, such as zink oxide and fatty acids, increase the rate of sulphur combination and cause the sulphur to be utilized more efficiently for cross-linking purposes; the characterization of vulcanizate structures is essential if the distinctive physical and ageing properties of different vulcanizates are to be understood.

'A schematic representation of a gum-vulcanizate is given (Fig. 1); it shows the network proper together with extraneous material which has either been added in the original vulcanizing mix or has resulted from the vulcanization reaction. The network itself consists not only of the rubber chains and cross-links, but includes modifications of the main chain which occur directly or indirectly during vulcanization. Examples of the latter are the introduction of cyclic sulphide structures, scission of the main chain, and disturbances of the regular repeat-

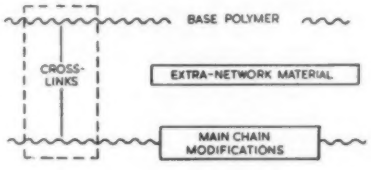


Fig. 1. Structural features of gum-vulcanizates

pattern of the olefin units in the parent rubber.

'The variety of such networks obtainable in natural rubber is expressed in Fig. 2. These range from the simplest structure (I) which results from vulcanization by either

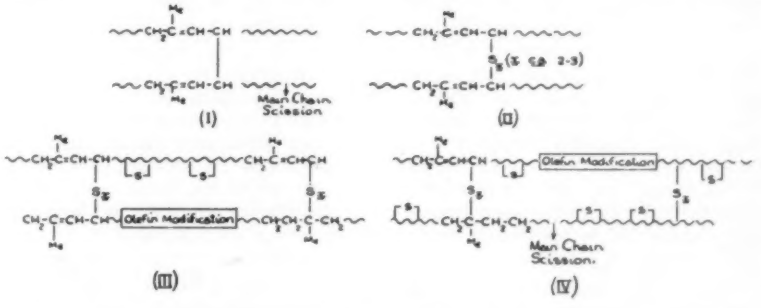


Fig. 2. Typical network structures obtained by vulcanizing natural rubber by different methods

organic peroxides or by high energy radiation, to the extremely complex structure (IV), which results from unaccelerated sulphur vulcanization. Intermediate between these extremes are found networks such as (II) which is formed on vulcanization with tetramethylthiuram disulphide and zinc oxide, and (III) which results from conventional mercaptobenzthiazole (MBT)-accelerated system at 140°C. Evidence is now accumulating that in accelerated sulphur systems there is no unique network structure, but that there is a variation from structure (II) to structure (IV) depending on the vulcanizing temperature and the relative concentrations of the reactants present.'

Data given in a graph in the report shows that merely by changes in the temperature and amount of fatty acid present in an MBT-sulphur system, a threefold change in ultimate degree of vulcanization is attainable for a given amount of sulphur.

New Methods of Vulcanization

'The marked influence of network structure on the oxidative ageing and tensile properties of conventional vulcanizates justifies the search for alternative ways of forming natural rubber networks of novel and desirable characteristics. Three new vulcanizing methods are being evaluated in which the cross-links and other network modifications introduced differ markedly from the conventional. The first common requirement was to introduce suitable reactive chemical groups into the rubber molecule; this has been effected by treatment with perbenzoic acid, monochlorothioacetic acid, and ethyl thioglycollate, all three reactions proceeding most efficiently in latex. The structural modifications so obtained are as shown (Fig. 3); at the modification levels required (2-10 mole % of combined adduct) all the products are rubber-like.

'It is known that mono- and di-alkyl epoxides react readily with compounds containing hydroxyl, carboxyl, thiol, and amino groups, but the modified rubber (I) is a tri-alkyl epoxide and the reactivity of this type of compound has not previously been described. Investigations have shown that such compounds are comparatively inert, and although it

has been possible to cross-link epoxidized rubber by treatment with bi-functional reagents containing the various groups mentioned above, the reaction conditions required are unsuitable for technological application.

'The modified rubbers containing chlorine and ester groups (Fig. 3, II and III) are readily cross-linked by reaction with dibasic pyridine compounds and calcium hydroxide respectively. The vulcanizate obtained from (II) appears to contain both covalent and electrovalent cross-links; the precise nature of the first is not known, but the second is as shown in Fig. 3. The vulcanizate obtained from (III) probably contains only electrovalent cross-links, and is similar in structure to the vulcanizates obtained from synthetic ester-containing rubbers which have been treated with metallic hydroxides.

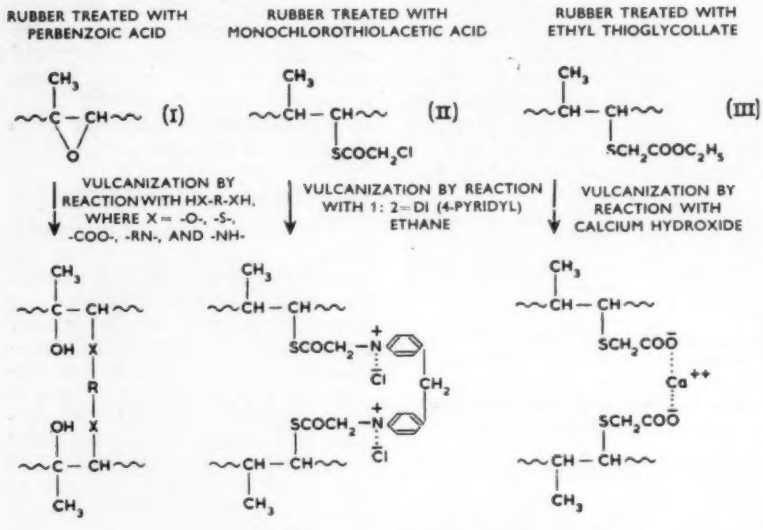

RUBBER TREATED WITH PERBENZOIC ACID
RUBBER TREATED WITH MONOCHLOROTHIOLACETIC ACID
RUBBER TREATED WITH ETHYL THIOGLYCOLLATE
(I)
(II)
(III)
VULCANIZATION BY REACTION WITH HX-R-XH, WHERE X = -O-, -S-, -COO-, -RN-, AND -NH-
VULCANIZATION BY REACTION WITH 1: 2-DI (4-PYRIDYL) ETHANE
VULCANIZATION BY REACTION WITH CALCIUM HYDROXIDE

Fig. 3. New cross-linking reactions for natural rubber

'Small scale technological evaluation of the vlucanizates obtained from (II) and (III) shows their physical properties to be as follows: (i) Gum compounds from (II) are very weak, indicating that this rubber does not crystallize on stretching; (ii) carbon black reinforced compounds from (II) have strength, elastics, and ageing properties very similar to conventional sulphur vulcanizates; (iii) under normal conditions the vulcanizates from (III) have high tensile strengths and generally behave like reinforced rubbers, although no reinforcing filler is present; (iv) the physical properties of the vulcanizates from (III) are markedly dependent upon the testing conditions, *e.g.* in the presence of small amounts of water and at low rates of extension, their high modulus and strength properties are considerably reduced. Large scale evaluation is now in progress.

High Energy Irradiation of Rubber

'It has been known for several years that rubber can be vulcanized by exposure to high energy radiation such as γ-radiation from a cobalt-60 source or a beam of electrons from a linear accelerator. In addition to cross-linking, however, a scission of the main carbon chain in the rubber molecule also occurs, and the relative rates of these two reactions effect the physical properties of the irradiated rubber. Methods have now been developed for determining the ratio of cross-linking to scission; under the conditions so far studied it is about 8:1.

'Irradiation of the rubber produces a gas which is almost pure hydrogen. Determination of the relationship between the hydrogen evolved and the cross-links formed yields information on the mechanism of the cross-linking reaction; rather more than one cross-link is formed per molecule of hydrogen evolved.

'The number of cross-links formed is greatly reduced in the presence of certain additives. Since the effective additives (*e.g.* nitrobenzene) are compounds known to react readily with alkyl free radicals, their main role is probably to prevent rubber radicals, formed by fracture of carbon-hydrogen bonds, from combining to give carbon-carbon cross-links. It is of interest that the same additives can also decrease the yield of hydrogen. From a practical point of view, this effect is of importance in the compounding of rubber which is required to withstand radiation damage in service.

'The addition to rubber of a small amount of a chlorine-containing additive such as carbon tetrachloride markedly increases the yield of cross-links on irradiation. This enhancement of vulcanization efficiency may well be a factor conditioning the practical development of radiation vulcanization.'

FOAMAIR

Foamair Ltd., 71-73 Upper Street, Islington, London, N.1, manufacturers of 'Foamair' polyurethane and PVC foams, etc., have achieved success in recent times with the design and production of foams for special application. Notable amongst these is the preparation of polyurethane foam sheets with an adhesive backing used to line computers, etc. One of the particular values of this material for insulation applications is that its K factor is the same as cork. The physical properties of compression set, tensile strength, elongation at break, etc., compare favourably with other foams and similar materials.

Present and successful applications for the foam include thermal and acoustic insulation, packaging, upholstery, mattresses and pillows, etc., for hospital use, and in aircraft fitting. The manufacturers will supply the foam in any colour, size, shape, or quality, and the company is able to cut the material to within 1/64th in. Additional properties are chemical and insect resistance.

Firestone Appointment

Mr C. G. Charlish, Firestone trade sales manager, has announced the appointment of Mr D. A. Gracie as Firestone Bristol district manager. Mr Gracie joined Firestone in 1930 and was for many years sales representative in the West Country. Since 1948 he has been district manager in Cambridge. Mr Gracie's position as district manager in Cambridge has been filled by the appointment of Mr W. Fletcher, who for many years has been Firestone sales representative in Liverpool.

Canadian Asbestos

Shipments of asbestos from Canada's mines in September this year rose to 98,363 tons from 88,992 a year earlier, placing the January-September total 15.3% at 757,287 tons ahead of last year (647,086). Mines in Quebec shipped 92,853 tons in the month (84,391) and 713,068 tons in the nine months against 618,504. Exports in September were up to 95,726 tons from 80,848 a year earlier, making the nine-month total 19.5% greater than last year at 729,761 tons as against 610,670.

COMPANY MEETING

Harrisons and Crosfield Ltd.

SATISFACTORY RISE IN PROFITS

THE annual general meeting of Harrisons and Crosfield Ltd., will be held on December 8 in London.

The following are extracts from the circulated statement by the Chairman, Sir Leonard Paton, C.B.E., M.C., for the year to June 30 1959:

Group profit attributable to the parent company (after minority interests £1,179) is £1,257,110. Taxation required £632,862 and, adding the amount brought forward from last year, £452,834, makes the balance available £1,077,082. It is proposed to appropriate £248,269 for capital reserve and £71,393 to general reserve, a total of £319,662. Preferential and management dividends take net £82,995 and deferred ordinary dividend and bonus net £183,751, a total of £266,746, leaving to be carried forward £490,674.

The directors recommend a final dividend of 10% on the deferred ordinary stock, repeating last year's total of 15% for the year. In addition, they recommend the payment of a bonus of 5% on the deferred ordinary stock. Under the articles the directors would have been entitled to draw additional remuneration in respect of the payment of this bonus, but have waived their right.

Group Trading Profit

It is satisfactory to report a rise of £84,000 in profit, after tax, from a year's operations in conditions no more favourable than a year ago. This year the Eastern offices have contributed to the increase and we continue to trade intensively there except where government intervenes. It is a disturbing manifestation of nationalism when attempts are made to divert certain spheres of trade either to the local government itself or to its own nationals. This checks the normal flow of commerce and in the result tends to retard rather more than advance the rise in the standard of living which all of us ardently desire to see the Eastern peoples enjoy.

There are some interesting changes. Group reserves themselves have increased by £376,052 to £5,030,455.

As a matter of administrative convenience, two new subsidiaries, Harrisons and Crosfield (Federation of Malaya) Ltd., and Harrisons and Crosfield (Singapore) Ltd., were formed to continue in their respective territories from January 1 1959, the business formerly conducted in both territories by Harrisons and Crosfield (Malaya) Ltd., now in voluntary liquidation.

Proposed Scrip Issue

The directors consider that out of this £1,463,800 transferred to the parent company's capital reserve, £1,000,000 should be made available to deferred ordinary stockholders by way of increase in capital. It is therefore proposed to make to existing holders a free scrip issue of 1,000,000 fully paid deferred ordinary shares of £1 each (to be converted upon issue into stock) in the proportion of two new £1 shares for every £3 stock held.

Trade investments increased from £1,079,000 to £1,377,000 due partly to the acquisition of an interest in South Africa, and partly to increased holdings in other associated companies.

The value of these investments is in excess of the amount at which they stand in the balance sheet.

After dealing with events in the countries in which the company has interests, the statement continues:

Tea

Prices: For the past three years the tea markets of the world have been relatively stable. The average price of all tea sold on the London market during 1958 was slightly over 4s. 7d. per lb. compared with 4s. 5¼d. during 1957. Up to the end of October 1959, the average price has been a little over 4s. 5¾d. Retail prices in this country were last changed in June 1957 and the average household packet currently retailing in the region of 6s. to 7s. per lb. affords scope for a satisfactory margin to the packer and the retailer. The producer is less fortunate and in many cases these average prices allow him little if any profit.

Government Imposts. — Export duties and taxes continue to be a burden on producers, but in India some small amelioration has been granted by the reduction of export duty from a flat 7d. per lb. to an export duty of 4½d. plus a sliding scale of excise duty on a zonal basis ranging from ⅜d. for Cachar, the Terai, Lower Assam and much of South India, to 2¼d. for Upper Assam and the Nilgiris. In Ceylon also the export duty has been reduced to 6¼d. plus an *ad valorem* sales tax ranging up to a maximum of 1s. 0⅜d. This is of some advantage to producers of plainer teas but penalizes good quality which now bears export duties of 1s. 7d. per lb.

Prospects.—As things are there seems seems little cause for the British housewife to fear an increase in the retail price of tea at present. In times of advancing markets, packers are reluctant to increase retail prices owing to the dislocation in their channels of distribution. Understandably, when the market reverses the trend, there is sometimes reluctance to match the fall promptly with a cut in retail prices. Present indications are that any change in the foreseeable future would be downward.

Rubber

The background to rubber in 1959 has been the improving economic climate in the USA and Western Europe, bringing increased demand, reinforced with strong buying by Communist countries.

The general result has been higher prices, and at times a scarcity of supply for near delivery.

Prices: Prices have continued upwards for the last 18 months with few serious interruptions. Up to October 1959 No. 1 RSS averaged 29d. per lb. compared with 23¾d. for the whole of 1958. The premium for spot London over forward positions has been as much as 6d. per lb. due to special market factors.

USA: The economic recovery in the USA stimulated demand for cars; 1959 sales are expected to reach about 6¼ million by the end of the year apart from some further half million imported cars. The upward trend in trade also brought increased sales of trucks and truck replacement tyres. Consumption of natural rubber has continued substantially greater than last year, but doubtless due to the high price, the proportion of natural has declined. In July the percentage fell to 33.6, but some recovery has since occurred. Total tyre sales may reach 113 million this year compared with 99 million last year, the increase being mainly in passenger types.

Prospects: Demand for natural rubber continues satisfactory. Certain countries, notably Japan, have indicated increased requirements and potential demand elsewhere is good. Production of natural can only be increased marginally each year and supplies from the largest producer, Indonesia, are unpredictable. So far as can be seen there should be an outlet for all natural rubber likely to be produced in 1960.

General

Profits for the year now current are fully comparable with those at this time last year, but it would be imprudent to suggest now that the pattern will persist until June 30 next. Our operations cover many territories and in each we have to live with the Government of the day. Governments now intervene in all aspects of business more than ever before and action by any one can easily make even established sources of remuneration precarious.

The company has never been stronger or more ready to grasp new opportunities than today.

Book Reviews

HOT ORGANIC COATINGS. — By R. B. Seymour. (pp. lx + 233. Reinhold Publishing Corporation, New York, 1959. Chapman and Hall Ltd., London. 60s.)

Hot coating techniques are of value when it is required to cover objects with relatively heavy plastic films in a minimum number of coats. Incidental advantages over solvent coatings applied at ordinary temperature include reduction in porosity, orange-peel, sagging and other defects. While all thermoplastic materials have potential application in this field, those best established are cheap materials such as coal tar pitch which is used extensively in the corrosion proofing of heavy pipe lines. This present book classifies the subject by materials, each chapter opening with a brief account of the material's nature and constitution, then some application details and finally a brief review of the properties of typical coatings. This treatment generally makes for clear and orderly presentation and the book remains easily readable by chapter despite the frequent appearance of tabular matter.

Among the materials discussed are polythene (including reference to the 'swirl-sinter' fluidized bed process); paraffin, Fischer-Tropsch and other waxes; terpene and other resins; polyisobutene and rubber derivatives; cellulose derivatives (with special reference to hot melt dip coatings); polyvinyl chloride; and asphalts and bitumens. Other processes which receive attention are flame spraying, centrifugal pipe lining, 'hot' solvent and other hot spray techniques.

The book is clearly printed particularly in respect of the numerous photographs which the author has chosen to illustrate the application side of his subject. It is unfortunate that a number of misprints remain in the text, for example, 'sales' for 'scales' (p. 11), slate 'floor' for 'flour' pp. 21 and 22, and only corrected on p. 38, and so on. Again the balance of the book might be questioned, 'coal tar pitch' being accorded only eleven pages of which more than eight consist of tabular matter, while 'asphalts and related minerals' are allowed twenty-four pages including a useful description of the chief sub-divisions in this group of materials. The defect is largely remedied by the inclusion of a chapter on 'Hot-applied Coal Tar pitch-base coatings' by G. B. McComb, which gives an excellent summary of the technology of these important materials. Organosols and plastisols are not really given a fair innings although their importance is acknowledged in the final chapter on future developments. Indexing is short but adequate for most readers but once again the value of this book would have been enhanced by judicious inclusion of references to the original literature, particularly in respect of patent applications.

However, these criticisms concern points of detail and in all the author should be congratulated on his successful attempt to correlate and condense a vast mass of material hitherto resting between the plastics and surface coatings industries and formerly fully accessible to neither.—D. A. S.

ORGANIC SEQUESTERING AGENTS.—(By S. Chaberek and A. Martell. pp. xv 616. John Wiley and Sons Inc., New York, 1959. Chapman and Hall Ltd., London. 200s.)

This book is likely to remain the standard work on its subject for some little time to come and the shortness of the present review is merely dictated by the somewhat marginal interest of the rubber and plastics industries in chelating agents.

Aside from their use in analytical chemistry, for example in the determination of metals such as calcium, magnesium, zinc, iron, copper, manganese, etc., chelating agents find application as antioxidants (*e.g.* 'copper inhibitors'), in latex compounding to control the concentration of coagulating metal ions, and in the manufacture of synthetic rubbers. On p. 364 *et seq.* is found a short account of the use of ferrous ion-EDTA complexes in order to regulate free ferrous ion concentration in the initiator systems for 'cold' butadiene-styrene polymerization. Use of these complexes is claimed to eliminate difficulties which occurred in older pyrophosphate and similar systems due to hydrolysis and precipitation of the ferric ion in the aqueous phase.

Chapter 7 on the commercial applications of chelating agents is of general interest and may well suggest new uses of these materials to manufacturers of rubber chemicals. In general, the book is well referenced and indexed and clearly printed on good paper as befits its rather high price. Its value as a work of reference is enhanced by the inclusion of much tabular material all suitably referenced to the original literature.—D. A. S.

∴ Copies may be ordered through the Books Department, RUBBER JOURNAL AND INTERNATIONAL PLASTICS, Maclaren House, 131 Great Suffolk Street, London, S.E.1.

Export Opportunities

Plastics—Western Germany

Universal Eisen und Stahl AG (formerly Universal Draht Handels-G.m.b.H.), Düsseldorf, Feldstrasse 32, have informed the British Consulate-General at Düsseldorf that they would like to represent UK manufacturers of plastics hollow-ware, plastics toys and plastics tableware.

Manufacturers interested in this agency enquiry should write direct to the Düsseldorf concern and notify the British Consulate-General, Cecilienallee 16, Düsseldorf, that they have done so. B.o.T. reference: ESB 21303/59.

Plant for Making Collapsible Polythene—India

Gladwyn and Co., 251 Hornby Road, Fort, Bombay 1, have informed the UK Trade Commissioner at Bombay that they are interested in getting in touch with UK manufacturers who can supply a complete plant to manufacture collapsible tubes from polythene. The plant should be complete with a printing machine. These collapsible tubes will be used mainly for filling with pharmaceutical pastes.

Manufacturers interested in this enquiry should write direct to the Indian concern with full details of their offers and notify the United Kingdom Trade Commissioner P.O. Box 815, Mercantile Bank Building, Mahatma Gandhi Road, Bombay, No. 1, that they have done so. B.o.T. reference: ESB/24086/59.

The address of the Export Services Branch of the Board of Trade is Lacon House, Theobalds Road, London, W.C.1. Telephone number: Chancery 4411, extensions 776 or 866.

Krynac, a special type of synthetic rubber compound which is resistant to heat and oil, is now being imported from the United States for use on Dunlop 'Safetymaster' boots and shoes as optional soling to the conventional moulded rubber. The boots shown have a special steel toecap tested to withstand an impact of 150 ft. lb. according to British Standard Specification

WORKS CHEMISTS . . .

If you are specifying an oil as an ingredient in your product, or as a processing aid or a carrier for less manageable materials . . .

THINK ABOUT A MINERAL OIL . . .

Shell will use all its resources of men, money and many refineries to give you exactly what you are looking for.

AND THINK ABOUT SHELL

You can be sure that Shell will have an oil of the right characteristics and with the right properties.
A Process Oil to fit your plan.

SHELL PROCESS OILS

SHELL
process oils

Telephone your local Shell-Mex and B.P. Ltd. Branch Office for further information.

PATENT SPECIFICATIONS

The following information is prepared from published Patent Specifications by permission of the Controller of H.M. Stationery Office. The full Specifications can be obtained from the Patent Office, 25 Southampton Buildings, W.C.2, at 3s. 6d. per copy (including postage).

Halogenated Butyl Rubber Compositions

No. 814,699. Esso Research and Engineering Co. Application and Filed, July 5 1957. Application in USA, July 9 1956 and June 26 1957. Published, June 10 1959.

Good adhesion between synthetic fibres, especially nylon, and rubber, particularly butyl rubber, is achieved by treating the fibres with an aqueous system of which the solid component comprises a mixture of halogenated butyl rubber and a phenol-aldehyde resin. The halogenated butyl rubber contains 0.5% of combined chlorine or bromine and the proportion of phenol-aldehyde resin is preferably 10 to 40 parts per 100 parts of halogenated butyl rubber. The process is particularly intended for the treatment of tyre cord.

Chlorinated Polythene

No. 815,088. Phillips Petroleum Co. Application and Filed, July 7 1955. Application in USA, July 12 and 29 1954. Published, June 17 1959.

Polythene prepared according to the process of Specification No. 790,195 is dissolved in carbon tetrachloride or similar low-boiling chlorinated solvent by heating the solvent above 76°C. (preferably 95° to 130°C.) under pressure and the solution is then chlorinated while the pressure is maintained. This procedure is necessary because polythene prepared as stated is only partially soluble in carbon tetrachloride at atmospheric pressure. By the procedure described, a chlorinated polythene can be obtained which is soft and rubbery and substantially colourless. The chlorinated polythene is useful for the manufacture of adhesives, surface coatings, sheets, films and moulded articles. It can be formed into tubes and containers and can be used as a liner for metal tanks or as a constituent of protective coating compositions.

Shorter Abstracts

Pneumatic Tyres. 813,376. Dunlop Rubber Co. Ltd. Filed, July 2 1956.—Apparatus is claimed for making a pneumatic tyre of the construction described in Specification No. 786,162 (*RJIP*, February 22 1958, page 308).

Heat Treatment of Rubber-Filler Masterbatches. 813,922. Esso Research and Engineering Co. Filed, April 18 1956.—The properties of vulcanizates of natural rubber, or synthetic rubbers of high unsaturation, containing a mineral filler other than carbon black are improved by heating the rubber-filler masterbatch prior to the addition of vulcanizing and other ingredients.

Non-corrosive Polythene. 813,864. The Dow Chemical Co. Filed, December 10 1956.—Polythene prepared by the Ziegler process is rendered non-corrosive by incorporating in the polythene a polybasic carboxylic acid salt of a metal of Groups 1 or 2 of the Periodic System.

Vulcanization of Butyl Rubber. 813,964. Esso Research and Engineering Co. Filed, June 4 1957.—Phenol dialcohols are claimed as vulcanizing agents for halogenated butyl rubber and mixtures of butyl rubber with halogenated butyl rubber.

Vinyl Acetate Polymerization. 814,067. Celanese Corporation of America. Filed, October 20 1955.—Aqueous emulsions of polyvinyl acetate are produced by polymerizing vinyl acetate in aqueous emulsion in the presence of decahydronaphthalene.

Vinyl Acetate Polymerization. 814,068. Celanese Corporation of America. Filed, October 20 1955. Divided out of 814,067. — Aqueous emulsions of polyvinyl acetate are produced by polymerizing vinyl acetate in aqueous emulsion in the presence of a chelating sequestering agent containing amine and carboxylic acid groups or an alkali metal salt of such a compound.

Rubber Statistics

MALAYAN SHIPMENTS AND IMPORTS — SOLE CREPE

DETAILS of Malaya's ocean shipments and imports for the month of September have now been issued by Malaya House. The following tables, which are expressed in long tons, summarize the information issued.

Ocean Shipments to	Sheet and Crepe	Latex
UK	9,580	2,889
USA	14,559	2,291
South Africa	1,383	78
Canada	2,961	7
Australia	2,354	566
France	2,825	524
Western Germany	6,903	1,999
Italy	2,720	510
Netherlands	1,029	175
Poland	2,805	630
Spain	1,219	95
Sweden	1,355	67
USSR	15,524	—
Argentina	1,599	124
Brazil	2,340	—
China	9,375	—
Japan	4,972	1,898
South Korea	1,138	17
Others	7,518	649
	92,159	11,619

Imports from	Total
Indonesia:	
Sumatra	15,448
Borneo	8,739
Remainder	3,174
British Borneo	3,602
Thailand	2,489
Others	906
	34,353

Stocks of rubber in Singapore at the end of September were some 6,000 tons down on the previous month's figure, with 33,616 tons as against 39,315 tons. Of this total, 25,089 tons were held by dealers, 8,498 tons were in the port and 29 tons were on estates. In addition, there were 1,490 tons of rubber awaiting transhipment to destinations outside Singapore. In the Federation at the end of the previous month stocks had stood at 65,253 tons, of which 41,929 tons had been in the hands of dealers, 16,668 tons on estates, and 6,656 tons in the ports.

Sole Crepe

Details of sole crepe exports from Malaya, Ceylon, Vietnam and Cambodia have now been made available by the Secretariat of the International Rubber Study Group for the month of August last.

Malaya's sole crepe exports amounted to 625 tons, and brought the year's total to the end of August to 4,067 tons. This was approximately 2,000 tons less than the comparable total for 1958. In particular, exports of sole crepe to the UK had fallen from 2,925 tons to 1,642 tons, those to Poland from 812 tons to 55 tons, and those to Spain from 753 tons to 459 tons. The only country among the larger consumers to show a significant increase was France, exports to this destination rising from 259 tons to 667 tons.

Ceylon's August exports of sole crepe amounted to 105 tons, and brought the total for the year to 537 tons, just over 200 tons less than the total for the first eight months of last year. Here again there had been a significant decline in exports to the United Kingdom, with 99 tons instead of 252 tons, and exports to the USA had fallen from 122 tons to 22 tons. The only important increase, once again, occurred in the case of France, 151 tons having been exported to this country as against 97 tons last year.

Exports to Vietnam and Cambodia in August totalled 68 tons and 138 tons respectively, and brought the amounts exported from these two countries to 224 tons and 227 tons respectively.

CLAYTEX

ULTRA TREATED ALUMINO-SILICATE
FOR PALE AND PASTEL SHADES
HIGH PHYSICAL CHARACTERISTICS
EASY DISPERSION

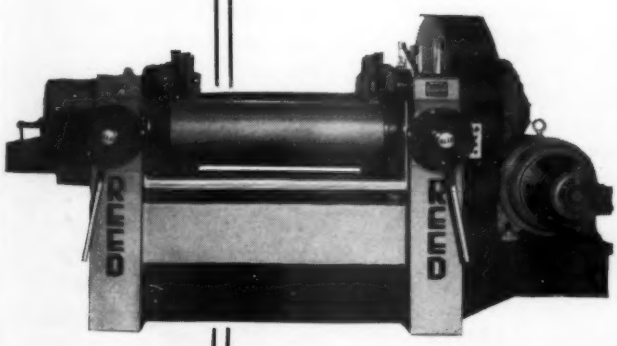
MADE BY FRANTERRE

EXCLUSIVE UK AGENTS:

WITCO CHEMICAL CO., LTD.

Head Office: **BUSH HOUSE, ALDWYCH, LONDON, W.C.2**
Telephone: TEMple Bar 6473/6476
PEARL HOUSE, PRINCESS ST., MANCHESTER 2 (Central 9066/8) 62 ROBERTSON ST., GLASGOW C.2 (City 3495)
Works at: **UNION LANE, DROITWICH SPA, WORCESTERSHIRE**
Also at · NEW YORK · CHICAGO DETROIT AKRON · BOSTON · CLEVELAND

REED BROTHERS (ENGINEERING) LTD.



REED BROTHERS
(ENGINEERING) LIMITED

GO
MONOBLOCK
FOR
GREATER STRENGTH
AND
SAFETY
60" x 22" S.G. MILL

REPLANT WORKS
Woolwich Industrial Estate, London, S.E.18
Telephone: Woolwich 7611/6 Cables: REPLANT LONDON

SOCTEX

HIGH GRADE 60% CENTRIFUGED LATEX

SOLE SUPPLIERS IN THE U.K.

HENRY GARDNER & CO. LTD

2 METAL EXCHANGE BUILDINGS, LONDON, E.C.3

Telephone: MANsion House 4521

143 ROYAL EXCHANGE
MANCHESTER, 2
(Blackfriars 3641)

98 WEST GEORGE STREET
GLASGOW, C.2
(Douglas 5433)

41 WATER STREET
BIRMINGHAM, 3
(Central 6471)

The ANALYSIS of RUBBER AND RUBBER-LIKE POLYMERS

☆

R.A.B.R.M. MANUAL No. 3

By WILLIAM C. WAKE
M.Sc., Ph.D.(Lond.), F.R.I.C., F.I.R.I.
HEAD of CHEMISTRY DIVISION
RESEARCH ASSOCIATION of BRITISH RUBBER MANUFACTURERS

THE first modern work devoted solely to this important subject to be published in the English language. In addition to the analysis of natural and synthetic rubbers, the author deals with rubber-like plastics such as Polyethylene, PVC, PVDC, PVA and Urethanes. Also discussed are the identification of compounding ingredients used in the manufacture of rubber and rubber-like polymers.

It will unquestionably become a standard work and is a "must" for all analysts interested in this subject.

CONTENTS:

Extraction Procedures - Qualitative Analysis for Polymer Type - Elemental Analysis of Extracted Polymer - Direct Determination by Functional Group Analysis - Solution and Dissolution Methods - Quantitative Cracking and Distillation Methods - Carbon Black in Rubber - Ashing, Wet and Dry, and the Determination of Trace Metals - Analysis of Extracts and Blooms - Statistical Aspects of Analytical Work.

Prospectus on request from
RUBBER JOURNAL AND INTERNATIONAL PLASTICS
MACLAREN HOUSE
131 GT. SUFFOLK STREET, LONDON, S.E.1
Tele: HOP 5712

PRICE
50/-
By post 52/-
U.S.A. and CANADA
$8

Rubber and Plastics in South Africa

NEWS OF FIRMS AND PRODUCTS

IN the third quarter of this year the seasonal activity in the plastics industry was evident and this condition will remain until towards the end of the year, as there is an increasing call for plastic goods such as toys and novelties for the Christmas trade. Competition is stated to be keener this year than last year. The range of plastics in production is wider than ever before and good orders are in hand.

Paint Production Problem

South African paint distributors are expecting some difficulty with supplies of poly-resins soon because of the fire which destroyed South Africa's only synthetic resin factory in East London in August. Damage was estimated at between £300,000 and £400,000. A prominent distributor said: "Paint factories will have to import their synthetic resins until the East London factory can go into production again. Because of the customs duties imposed on resins to protect the South African industry, imported resins will cost more than the East London product. But I do not think this increase will be passed on to the consumer. The factories will probably bear the cost. Until these resins arrive, there will probably be minor shortages of some types of paint. But I do not think it will last for more than a few weeks."

Insulation Materials

Bradford Insulation South Africa (Pty.) Ltd., PO Box 72, Randfontein, Transvaal, are including in their current range of insulation materials 'Frigopor' (polystyrene) for the insulation of cold rooms and pipework. It is a light material easy to handle and can be cut by an ordinary knife. Among the other heat insulation materials manufactured by this firm are 'BI Insulwool,' used in industry for the conservation of heat and raising the efficiency of boilers, etc.

Japanese Copying

Lectrolite Products (Pty.) Ltd., Johannesburg, are producing a vast range of small items for the automotive industries, including a rear light assembly which has a metal body and a plastic lens. Later the competition of Japanese manufacturers who produced faithful copies of the Lectrolite article led to the production of a cheaper moulded plastic unit. The firm is also making a more superior assembly with a chromium rim and this is appealing to a large percentage of users.

Polythene for Agriculture

Pretoria Industrial Plastics, Pretoria, are introducing agriculture in South Africa to polythene film and sheeting, the latter being suggested as suitable for casing furrows to prevent seepage, to protect out-of-season vegetables and for covering greenhouses in the place of glass, which is so much more expensive. Black sheeting is being offered as a means of protecting timber and plywood roofing and for mulching around shrubs to keep sunlight from weeds. This firm is making toilet seats from acetate, the seats and covers being moulded in a single operation and finished with nylon hinges. Buckets are being made in polythene, either as separate units or fitted with styrene base and binette mechanism. It is said that these items do not make a noise when in use, are easy to clean and cannot corrode. Household ware and basins are also being made in this material. This company is also undertaking the manufacture of custom-made articles for any industrial application, these items being finished to very high quality standards.

Coating Tile

Evershield Products (Pty.) Ltd., Durban, is making under licence the self-baking liquid coating tile made by the Evershield company in Joppa, Maryland, US. This is a specialized thermosetting resin which is applied as a liquid and bakes into a vitreous hard surface. It is made from polyester, inorganic pigments, light stabilizers and surfacing additives and it is expected to enjoy a very strong demand in South Africa, as it has many points to appeal to the local market.

National Plastics

Baring Brothers and Co. has announced that its offer on behalf of Group Developments, a subsidiary of Courtaulds, to acquire the issued ordinary capital of National Plastics, has received more than 90% acceptance and is now unconditional.

FBRAM TRANSPORT MEETING

The annual open meeting of the Transport Committee of the Federation of British Rubber and Allied Manufacturers took place at the Café Royal, London, on November 12, and was well attended.

The guest speaker, Mr F. J. W. Wagstaff, of British Railways, was well qualified to speak on the subject of delays on the passenger parcels service since he is Acting District Passenger Manager of the London Midland Region and has his office at Euston. Mr Wagstaff gave an interesting address outlining the difficulties confronting the railways at the present time in securing the right type of railway man, prepared to work on shifts over the 24 hours, for what would seem to many industrialists an inadequate rate of pay. He also described the plans British Railways have for coping with all kinds of freight traffic under their modernization scheme.

In an atmosphere of mutual candour after the talk members of the committee and visitors exchanged views and made suggestions to the speaker on interim measures that could be taken to improve service to traders sending urgent parcels by passenger train. It was voted an exceptionally happy occasion.

CORRESPONDENCE

Hancock's Invention

To the Editor

Sir,—In the paper 'Inventions of the First Rubber Articles' (*RJIP*, October 3, page 280), Dr Schurer writes '. . . the brilliant use Hancock made of it (Fresnau's discovery of the natural adhesion of natural rubber) for the construction of his masticator.'

This statement puts Hancock's invention in the wrong light and one cannot do better than refer to his own book published in 1857, where on pages 9 and 10, he describes how he made a machine to tear up the bits of natural rubber into shreds with a view to moulding them into blocks.

He goes on to say '. . . it soon became evident that some action was going on inside that I had not reckoned upon . . . the cylinder was opened . . . to my great surprise, came out a round ball.'

There are still copies of this book about and it is still worth reading. The plates alone are worth seeing, when one considers the number of things treated as new inventions which were pictured over 100 years ago.

Yours faithfully,
FRANCIS M. PANZETTA.

15/11/59.
Bradford-on-Avon,
Wilts.

Rubber Markets

LONDON

Prices in the London rubber market have fluctuated sharply during the past week mainly in sympathy with movements in the East. Nevertheless, substantial gains are recorded on the week not only in Spot and nearby positions but also in the more distant positions. The Spot is 2d. per lb. higher at 37¼d. per lb., while forward positions record gains almost as large. The underlying strength of the market reflects confidence in the long term prospects for the commodity.

Latest prices are as follows:

No. 1 RSS Spot: 37½d.-38d.

Settlement House:

December 35¾d. nominal.
January/March 35d.-35¼d.
April/June 32¼d.-32½d.
July/September 31¼d.-31¾d.
October/December 30½d.-30¾d.

No. 1 RSS cif basis ports:

December 37d. nominal.
January 35½d. nominal.

Godown:

December 130½ Straits cents nominal.

LATEX

Centrifuged latex per gallon in drums, December shipment 23s. 6d., January, 23s. 3d., cif European ports. Spot, 24s., nominal 23s. 6d. Bulk, not quoted. Creamed, seller, December, 23s. Normal, seller, 16s. 11d.—December/January.

AMSTERDAM

The Amsterdam rubber market ruled as under on November 16:

No. 1 RMA	Guilders per kilo Nov. 16	Previous
November ..	3.70	3.53
December ..	3.70	3.53
January ..	3.56	3.41
February ..	3.56	3.41
March ..	3.56	3.41
January/March ..	3.55½	3.41

Sales: 60 Tendency: Firm

BANGKOK

No. 1 RSS

The price for No. 1 RSS, at Bangkok on November 16 was 38.62½ (38.37½) US cents per lb.

SINGAPORE

Despite lower overseas advices on November 16 the market opened at only a slight decline and advanced on short-covering and reserve of sellers. Conditions were quiet throughout the morning. Dealers were cautious. There was fair interest for lower sheets but in this section also sellers were reserved. The afternoon was quiet. The market had a steady undertone until just after the official close when the values moved up steadily to new highs. Trading was restricted but with free bidding the market finished the day on a firm note.

	Malayan cents per lb., fob Malayan ports to open ports Close	Previous Close
No. 1 RSS, Dec.	136½—136¾	129½—129½
Jan.	128¼—129¼	122 —122½
No. 2 RSS, Dec.	133 —134	126 —127½
No. 3 RSS, Dec.	129¾—130¼	123½—124½
No. 4 RSS, Dec.	127½—129½	121 —122
No. 5 RSS, Dec.	123½—125½	117 —119
No. 1 RSS Spot	146¼—148	139¾—141¾
No. 3 blanket, thick remilled Dec.	121½—123½	116 —119
No. 1 fine pale crepe, Dec...	140 —142	134 —136
2X thin brown crepe, Dec...	123½—124½	117 —119

Tone: firm

The Industries Syndicate quote latex, native produce, 60% centrifugal, packed in rectangular drums fob at 252.00d. per gallon.

CEYLON

No. 1 RSS

The price for No. 1 RSS Spot, at Colombo on November 16 was 164¾ (154) Ceylon cents per lb.

NEW YORK

The New York rubber market ruled as under on November 16:

DEALERS' PRICES

	Ex-dock, US cents per lb. Nov. 16	Previous
No. 1 RSS, Nov. ..	48¼a	47n
Dec. ..	46¼n	44½n
No. 2 RSS, Nov. ..	48¼a	46½n
Dec. ..	46 n	44½n
No. 3 RSS, Nov. ..	48 a	46½n
Dec. ..	45½n	44 n
No. 1 RSS, Spot ..	49 n	Unquoted
No. 3 Amber blanket crepe, Jan. ..	42½n	40½n
No. 1 Latex, thin crepe, Nov. ..	Unquoted	44½n
No. 1 Latex, thick crepe, Nov. ..	Unquoted	45 n

FUTURES—REX CONTRACT

	US cents per lb. Close	Previous Close
Nov. ..	49.00t	47.25b–47.70a
Jan. ..	44.95b–45.05a	42.95t
March ..	42.10t	40.00t
May ..	41.10t	38.95b–39.05a
July ..	40.25t	38.00t
Sept. ..	39.30b–39.50a	37.60b–37.80a
Nov. ..	38.70b–39.00a	37.20b–37.40a

Sales: 140. Tone: Strong

Rubber futures were strong on November 16 in thin dealings on covering and new buying. Traders said the strength of foreign markets induced the advance. Futures held firm later in the day, up almost two cents for the day. The volume of dealings was moderate. Traders said factories and dealers were not following the advance in the physical market backing away from the high-priced offerings. Futures remained strong in the closing stages when trading was fairly active.

DJAKARTA

The market was steady on November 16.

	Rupiahs per kilo Nov. 16	Prev.
Spot No. 1 Priok ..	49.00b	48.00b
Spot No. 2 Priok ..	48.00b	47.00b
Spot No. 3 Priok ..	47.00b	46.00b
No. 1 fine pale crepe, spot	45.00b	45.00b

Tone: steady

NEW I.C.I. HEAT TRANSFER MEDIUM

First in UK from Phenol Derivatives

A NEW heat transfer medium, first of this type to be manufactured commercially in Britain, has been added to the range of phenol derivatives made by the Heavy Organic Chemicals Division of I.C.I. Trade marked 'Thermex,' it is a eutectic mixture of diphenyl oxide and diphenyl in the respective proportions by weight of 73.5% and 26.5%.

A highly desirable combination of physical properties makes 'Thermex' particularly suitable for liquid-phase and vapour-phase heating and cooling in a variety of industrial processes. It has a high boiling point (255°C.) and low freezing point (12°C.), and excellent thermal stability over long periods at temperatures up to 400°C. It has high heat transfer coefficients, particularly in the vapour phase; further, it is non-corrosive and presents a negligible fire risk.

At high temperatures, 'Thermex' operates at low working pressures. For instance, at 250°C., when steam is at a gauge pressure of 565lb./in.² 'Thermex' is still in the liquid phase and at atmospheric pressure. At 350°C., the gauge pressure of steam is 2,385lb./in.² whilst the comparable pressure of 'Thermex' is only 80lb./in.² Furthermore, in vapour-phase heating, very accurate temperature control may be achieved simply by regulating the pressure. A single 'Thermex' boiler may be used simultaneously for several different consuming points by adjusting the pressure at each point to give the desired temperature.

One of the most interesting of many industrial uses for 'Thermex' is in the processing of plastics and rubber products by extrusion and moulding techniques.

Mr Harold H. ('Timber') Wood, formerly chief test pilot with Blackburn and General Aircraft Ltd., has joined the Microcell Group. He will be concerned with special sales liaison duties.

Industry INTELLIGENCE

Technical Data

Flexol Plasticizers for Vinyl Polymers

Flexol EP-8 and Flexol EPO are two new epoxy plasticizers for vinyl polymers, EP-8 being 2-ethylhexyl epoxy tallate and EPO being an epoxidized soybean oil. Information on the characteristics of these two plasticizers and data for their properties are given in a news release from the Chemicals Department, Union Carbide International Co., 30 East 42nd Street, New York 17, NY, USA. Both have high oxirane oxygen content and low unsaturation, resulting in excellent long-term compatibility, good stabilizing action as well as resistance to colour development and rancidity in vinyl polymer formulations.

The viscosity and solvating power of Flexol EP-8 are low and it imparts a low and stable viscosity to vinyl pastisols; also it reduces the dilatancy problem in plastisols used in high-speed coating operations. Vinyl film and sheeting containing EP-8 as the low-temperature plasticizer have good hand and drape. Flexol EPO has excellent resistance to extraction by oil and water when used to plasticize vinyl chloride polymers. These new Flexols are effective acid-acceptor stabilizers for chlorinated solvents and rubber, and plasticizers for nitrocellulose coatings and synthetic rubbers. It is anticipated that they will find broad use in vinyl polymers for products such as electrical insulation, calendered film and sheeting, coated fabric, garden hose, flooring, gaskets, foam and moulded articles.

Aluminium Silicates

Two aluminium silicates, namely Alusil 165 and Alusil 215, have been compared with three other brands of aluminium silicate in regard to their behaviour in two rubber compounds. Compound A contained natural rubber 100 and aluminium silicate 60 while compound B was a resin rubber containing natural rubber 40, high styrene resin 100 and aluminium silicate 80, both compounds containing appropriate vulcanizing ingredients. Results of laboratory tests on the compounds are reported in Progress Report No. 2, issued by Joseph Crosfield and Sons Ltd., Warrington, Lancs.

Data are given for the Mooney viscosity and Mooney scorch time of the unvulcanized compounds and for the following properties of the vulcanizates: tensile strength, elongation at break, modulus at 300% elongation, tear strength, hardness, compression set and tension set. The data show that Alusil 165 produces the best balance of tensile/hardness properties of the group of aluminium silicates tested. This applies to both compounds A and B. Alusil 215, while it does not show the same high level of tensile/hardness properties as Alusil 165, has the advantage of being easy processing and has low set properties. The cut growth resistance of the Alusils in resin rubber compounds is stated to be quite satisfactory although as this property is still being investigated, data are not included in the present report.

Modulac 147W

Modulac 147W is a 60% solution in white spirit of a drying-oil modified thixotropic alkyd resin and is designed for use as the sole medium in thixotropic gloss paints. Data for the properties of Modulac 147W and information on its compatibility, solubility and use in paints are given in Surface Coatings Literature No. 3 issued by Imperial Chemical Industries Ltd., Dyestuffs Division.

In the undisturbed condition, Modulac 147W is a firm thixotropic gel which breaks down to the free-flowing liquid state on agitation. The gel structure is restored when the resin solution is allowed to rest for a short time. The high viscosity of paints based on Modulac 147W in the undisturbed condition ensures perfect pigment suspension properties on storage and good resistance to flocculation. The paints have little or no tendency to drop or splash during application and they have excellent build and flow; they also exhibit resistance to after-yellowing to a high degree. Typical formulations are given in the pamphlet for white, green, maroon, red and yellow finishes containing Modulac 147W.

Machines, Materials and Equipment

Stenor Conveyor Belt Repair System

Stenor Ltd., Richmond, Surrey, have evolved, after considerable trials, the 'Stenorization' system for the maintenance of conveyor belts. The method used is vulcanization and there is no cold cure or stick-on patch, and damage up to one-third of the width of a belt can be repaired with practically no loss of strength, the manufacturers state. A portable kit incorporating all the tools and materials necessary for a repair can be taken to the trouble spot and all items are separately replaceable. The main item in the kit is the Stenor 'Weldbelt,' a specially designed portable vulcanizer. Double heating units give maximum coverage over any type of repair. They are thermostatically - controlled, ensuring perfect vulcanization and equipped with a safety warning light. Should any large repair require more than one cure, the heating units are so designed to enable this to be accomplished without 'set up' occurring at the edge of any preceding cure. Incorporated in the 'Weldbelt' is a simple attachment with which side pressure can be brought to bear, making perfect edge repairs possible.

New Publications

Romac Accessories

One of the most clearly arranged and comprehensive catalogues to be seen in the fields of motor and cycle accessories has been introduced by Romac Industries Ltd. Covering the company's entire range, the three-colour catalogue lists hundreds of different products within 40 categories and there are illustrations relating to every item. It is being distributed to 15,000 Romac stockists throughout Britain. The new publication is additional, and complementary, to existing Romac catalogues, each devoted to a particular group of products and carrying detailed descriptions. Introduction of the General Accessories Catalogue, perhaps the most important item of sales literature to be issued by the firm, marks Romac's 35th anniversary as manufacturers of equipment and accessories for the motor, motor cycle and cycle trades.

U.A.M. Compendium

Additions and modifications have been made in the latest edition, No. 16, of the pocket compendium of U.A.M. Group Products. The introduction explains its function in relation to the new series of full product catalogues, the two-monthly information bulletins and the U.A.M. group advisory service.

Guidance on the handling and stocking of asbestos cement sheets has been simplified by the inclusion of diagrams. There is a new easy-reference table of fitments for roof and wall sheets, in addition to the tables for area, weight and covering capacity. Information on Universal insulated sandwich constructions and single sheetings has been condensed and details of 'Seel' sprayed asbestos insulation have been included for the first time. The section on Unilux translucent sheeting, panels and rooflights has been doubled in size, and there is also more on Union pitch fibre pipes concerning the properties of the pipes and the wide range of fitments.

An excellent and far-sighted innovation is the publication of the compendium to International Size A6 (about 5⅞in. x 4⅛in.). Copies may be obtained from the U.A.M. Group Advisory Service, Tolpits, Watford, Herts.

SINGAPORE RUBBER FORWARD POSITIONS

Forwards have been hard to place in Singapore recently and now that buyers have withdrawn completely from the market all offerings of the more distant positions are being turned down, according to rubber brokers. This follows the rise which has taken No. 1 RSS December to 129¼ buyer 129½ seller and January to 122 buyer 122½ seller at the close on Friday November 13.

The lower sheet market has been extremely selective and rubber is definitely available in fair quantity from RSS No. 3 downward. The rate of arrivals from Indonesia has improved considerably. At current levels these should increase further, according to trade sources.

Rubber in Canada

Reflecting higher demand, especially for new motor vehicles, Canadian consumption of natural, synthetic and reclaimed rubber last September rose 12.8% in total to 24,033,000lb. (21,302,000lb.). The month's consumption of natural rubber increased to 9,561,000lb. (8,783,000lb.), synthetic to 11,105,000lb. (9,453,000lb.) and reclaimed to 3,367,000lb. (3,066,000lb.). More rubber was consumed in the manufacture of tyres and tubes in September at 17,165,000lb. (14,894,000 lb. year earlier), in wire and cable at 677,000lb. (563,000lb.), in footwear at 1,875,000lb. (1,708,000lb.) and 'in other products' at 4,316,000lb. (4,137,000lb.).

Domestic production of synthetic rubber in September rose to 11,377 long tons, compared to 11,107 tons month before and of reclaimed 554 tons against 294.

Consumption of natural rubber in September represented 40% of the total used in the industry compared to 40.7% in August. Synthetic usage was 46.0% of the total against 47.2% month before and reclaimed 14.0% against 12.1.

Solution to RJIP Crossword

(See page 648 this issue)

Across.—2, Antiscorch. 7, Air. 8, Conveyor. 10, Haunt. 11, Padding. 12, Nudge. 15, Cyril. 17, Colloid. 18, Tibet. 19, Peptiser. 21, Err. 22, Typewriter.

Down.—1, Bathing cap. 2, Around. 3, Tact. 4, Sinbad. 5, Open day. 6, Coo. 9, Regulators. 13, Golf tee. 14, Kisser. 16, Rubber. 18, Trot. 20, Ely.

TRADE MARKS

Objections to the registration of any of the undermentioned applications may be lodged with the Comptroller-General of Patents, Designs and Trade Marks at the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, within one month of the date mentioned. The objections must be stated on Trade Marks Form No. 7, cost £2, obtainable through any money order office. The extracts—from 'The Trade Marks Journal'—given below are reproduced by permission of the Controller of H.M. Stationery Office.

SEPHADEX (788,337) For polymers being chemical compounds for industrial use in the purification of chemical substances. By Aktiebolaget Pharmacia, Sofielundsgatan 2, Uppsala, Sweden. Address for service is c/o W. P. Thompson and Co., 12 Church Street, Liverpool. (Class 1; September 16 1959.)

STELMAX (788,575) For plastics in the form of solutions and of pastes; and adhesives for use in industry. By Drawform Ltd., 33c Green Lane, Walsall Staffordshire. To be associated with No. 784,018 (4229, 836). (Class 1; September 16 1959.)

ROTOCURE (B776,637) For machinery for use in the curing of elastomeric materials; and machine and conveyor belting. By American Biltrite Rubber Co. Inc., 22 Willow Street, City of Chelsea, State of Massachusetts, USA. Address for service is c/o Stevens, Langner, Parry and Rollinson, 5 to 9 Quality Court, Chancery Lane, London, W.C.2. (Class 7; September 16 1959.)

MELFLEX (776,080) For parts included in Class 9 made of leather or of imitation leather or of plastics used as substitutes for leather. By the Metropolitan Leather Co. Ltd., Terminal House, Grosvenor Gardens, London, S.W.1. (Class 9; September 16 1959.)

OPTOPLEX VACUUMATIC

(777,157) For watch crystals made of plastics in imitation of glass. By Optoplex Ltd., Station Avenue, Kew, Surrey. To be associated with No. 760,659 (4107, 312). (Class 14; September 16 1959.)

FABRILACE (789,281) For all goods included in Class 17. By Commercial Plastics Ltd., Willington Quay, Wallsend-on-Tyne, Northumberland. To be associated with No. 745,509 (4046, 1237). (Class 17; September 16 1959.)

MONTOTHENE (787,015) For all goods included in Class 17. By Monsanto Chemicals Ltd., Monsanto House, 10-18 Victoria Street, London, S.W.1. To be associated with No. 778,566 (4197, 1293) and others. (Class 17; September 16 1959.)

SARBU (783,348) For yarns of thermoplastics for textile purposes. By William Tatton and Co. Ltd., Buxton Road, Leek, Staffordshire. To be associated with No. 783,347 (4213, 381). (Class 23; September 16 1959.)

The adoption of a smaller typeface for the above items is a temporary measure designed to overcome the backlog of seven weeks' non-publication of the Journal owing to the recent printing strike.

Future Events

INSTITUTION OF THE RUBBER INDUSTRY

Manchester Section.—Monday November 23 at the Engineers Club, Manchester, at 6.45 p.m. 'Developments in Flame and Ozone Resistant Compounds' by L. Bustos, B.Sc., G. Gornil, A.F.I.C., W. A. Tandy, L.I.R.I., and J. Walker (Polymer (UK) Ltd.).

NEW COMPANIES

Integral Plastics Ltd. (629,210).—May 29. Capital: £800 in £1 shares. To carry on the business of manufacturers of and dealers in reinforced plastics, etc. The directors are: Kenneth Leveratt, 106 Avondale Avenue, Staines, Middlesex; Bernard J. Coff, 34 St. Michael's Avenue, Guildford, Surrey, and Samuel I. Levy and Klare Levy.

Paramic Plastic Co. Ltd. (628,388).—May 19. Capital: £5,000 in £1 shares. To carry on the business of manufacturers, exporters, importers and craftsmen and general workers and distributors of all kinds of plastic and plastic mouldings, etc. The directors are: Thomas L. Ward, 2 Harland Road, Bridlington, Yorks.; Leonard F. Booth, Axnold, Skirlaugh, Hull; Thomas Swinburne and Noel Walker. Regd. office: Fleet Chambers, Jameson Street, Hull.

Montrose (Plastic Products) Ltd. (628,557).—May 21. Capital: £500 in £1 shares. To carry on the business of manufacturers, wholesalers, retailers and dealers in household goods, including all household utensils and fittings, hardware, china and earthenware goods, furnishings, fabrics, furniture, leather and artificial leather and plastic goods, etc. The directors are: Montague Cohen and Rose Cohen, both of 367 Malden Road, Worcester Park, Surrey. Regd. office: 52-4 Gray's Inn Road, London, W.C.1.

North Manchester Plastics Ltd. (628,540).—May 21: Capital: £1,000 in £1 shares. To carry on the business of manufacturers of and dealers in and repairers of yachts and boats of glass fibre, plastic wood or otherwise, and ancillaries, accessories and equipment, trailers, caravans, racks and carriers, motor cars, etc. The directors are: Ernest Wheeldon, 11 Westcraig Avenue, New Moston, Manchester 10; Clifford Dunn, 35 Wilfred Street, Moston, Manchester, 10; and Mrs Kathleen Dunn, 29 Winnie Street, Moston. Regd. office: 11 Westcraig Avenue, New Moston, Manchester, 10.

Silicone Engineering Ltd. (629,814).—June 8. Capital: £100 in £1 shares. To carry on **inter alia** the business of manufacturers of and dealers in sponge rubber, soft rubber, plastic; engineers; to undertake research work, etc. The directors are: Bryan E. T. Rostron, Beech Bank, Knowsley Road, Wilpshire, Blackburn, and Harold Wilde, Sundown, Liverpool Road, Hutton, Preston. Regd. office: Brook House, Old Mill Street, Blackburn.

Industrial Plastics Machinery Co. Ltd. (628,622).—May 21. Capital: £1,000 in £1 shares. To carry on the business of importers, exporters and manufacturers of and dealers in any plant, machinery, equipment or apparatus capable of being used in connexion with plastic materials, etc. The directors are: George Frey, 145 Ivor Court, Gloucester Place, London, N.W.1; Francis G. Willinger, 17 Queen's Gate Terrace, London, S.W.7. Solicitors: Smith and Baron, 35 John Street, London, W.C.1. Regd. office: 35 John Street, Bedford Row, London, W.C.1.

Brador Plastics Ltd. (629,458).—June 3. Capital: £500 in £1 shares. To exercise, use, deal with and turn to account patent rights under British Patent No. 804001 of August 27 1958; to carry on business as merchants, traders, commission agents and carriers in the United Kingdom, France and elsewhere; and to manufacture, produce, trade and deal in toys and models whether mechanical or otherwise, and plastic goods of all kinds, etc. The directors are: Thomas L. Braddell and Mrs Jacqueline G. Braddell, both of 29 Hillcrest, Winchmore Hill, London, N.21. Regd. office: 29 Hillcrest, Winchmore Hill, London, N.21.

West End Mouldings Ltd. (629,028).—May 28. Capital: £100 in £1 shares. To carry on the business of moulders, manufacturers of and dealers in plastic substances, etc. The directors are: Philip Frush and Diana Frush, both of 10 Henson Avenue, London, N.W.2, directors of West End Plastics Ltd.; Barry I. Berman, 87-89 Baker Street, London, W.1. Regd. office: 87-89 Baker Street, London, W.1.

Hayes Rubber and Plastics Ltd. (631,719).—July 2. Capital: £1,000 in £1 shares. To carry on the business of dealers in, manufacturers and agents for manufacturers and suppliers of rubber, synthetic rubber, etc. Solicitors: Marris and Shepherd, Mitre Court Buildings, Temple, London, E.C.4.

PATENT LIST

Printed copies of the Specifications in the following list, published by permission of the Controller of H.M. Stationery Office, can be obtained from the Patent Office, 25 Southampton Buildings, Chancery Lane, London, W.C.2, price 3s. 6d., including postage, but about six weeks after the date of this publication will usually elapse before they come available. Orders with remittance may be sent in advance to the Patent Office, and will be fulfilled immediately the Specifications are published.

COMPLETE SPECIFICATIONS ACCEPTED

Open to public inspection on August 19 1959

Peterlite Products Ltd. Polymerization. 818,472.

Tee-Pak Inc. Polymerization process. 818,412.

Phillips Petroleum Co. Polymer recovery process. 818,461.

Esso Research and Engineering Co. Epoxidized hydrocarbon polymers as resin plasticizers. 818,388.

Farbenfabriken Bayer A.G. Polymerization products and the production thereof. 818,715.

Union Carbide Corporation. Methods and apparatus for curing vinyl resin foam. 818,418.

Vauxhall Motors Ltd. and Miles Ltd. H. G. Securing of flexible rubber sealing strips. 818,392.

British Thermostat Co. Ltd. Electric adaptors for use with thermostatic switching devices. 818,682.

Imperial Chemical Industries Ltd. Rubber compositions. 818,725.

Imperial Chemical Industries Ltd. Plastic composition and structures thereof. 818,728.

Bradley Container Corporation. Squeeze-to-use containers. March 28 1957. 818,605.

Esso Research and Engineering Co. Process for preparing dispersions of hydrocarbon resins and products obtained thereby. 818,735.

Union Carbide Corporation. Polymerization olefin oxides. 818,737.

Union Carbide Corporation. Stabilized vinyl resin compositions. 818,738.

Inventa Aktiengesellschaft Für Forschungund Patentverwertung. Manufacture of synthetic linear polyamides. 818,410.

United States Rubber Co. Devices for inflating and deflating articles. 818,444.

De Bataafsche Petroleum Maatschappij N.V. Stretching of polymeric material comprising or consisting of polymers or copolymers of ethylenically unsaturated hydrocarbons. 818,516.

Open to public inspection on August 26 1959

Farbenfabriken Bayer A.G. Process for polymerization of ethylene. 818,985.

B. F. Goodrich Co. Method and apparatus for producing silicon dioxide. 819,165.

Wacker-Chemie G.m.b.H. Process for the manufacture of nitrogen-containing copolymers. 818,843.

Esso Research and Engineering Co. Irradiation of polymeric compounds. 818,919.

M. M. True. Apparatus for mixing and dispensing an adhesive plasticized material. 818,862.

General Electric Co. Polythene of improved stability. 818,963.

Mullard Radio Valve Co. Ltd. Methods of etching silicon. 819,074.

American Cyanamid Co. Method of continuously removing residue shrinkage from a tow of continuous filaments of acrylonitrile polymer. 818,930.

Monsanto Chemicals Ltd. Surface treatment of toughened polystyrene. 818,900.

Conveying Developments Ltd. Idler roller assembly for use with conveyor belts. 819,142.

Communications Patents Ltd. Welding of thermoplastic material. 819,080.

E. I. Du Pont de Nemours and Co. Polymeric materials. 819,020.

Chemetron Corporation, formerly National Cylinder Gas Co. Process for producing cellular structure plasticized vinyl resins. 819,163.

Chemetron Corporation, formerly National Cylinder Gas Co. Composition and process for producing cellular structure plasticized vinyl resin. 819,164.

Industrie-Werke Karlsruhe A.G. Traversing motion in a bobbin winding machine for winding synthetic fibre yarns. 819,143.

Monsanto Chemical Co. Methylol melamine/phenol-formaldehyde adhesives. 819,044.

Esso Research and Engineering Co. Irradiation of polymeric materials. 819,147.

Pirelli S.p.A. Inflation valves of inner tubes of pneumatic vehicle wheel tyres. 818,848.

Plax Corporation. Apparatus for and method of making hollow plastic articles. 818,904.

Esso Research and Engineering Co. Method of processing hydrocarbon polymers. 818,826.

General Mills Inc. Synthetic resin compositions and reaction products thereof. 819,104.

Lonza Electric and Chemical Works Ltd. Process for the production of flexible laminates containing plastic materials. 818,830.

Fratelli Rotelli S.r.L. Heel for ladies' shoes, of plastic material, with wooden reinforcement. 818,975.

Chemische Werke Huls A.G. Stabilization of unsaturated polyester resins. 819,113.

Open to public inspection on September 2 1959

Rubber Improvement Ltd. and J. Lewis. Coated leather. 819,203.

Union Carbide Corporation, formerly Union Carbide and Carbon Corporation. Silicone elastomers. 819,245.

Pittsburg Plate Glass Co. Thermoplastic material for cutting into interlayer inserts. 819,263.

E. K. Cole Ltd. and B. Smith. Manufacture of moulded plastic containers. 819,250.

E. I. Du Pont de Nemours and Co. Polymers. 819,279.

Goodyear Tire and Rubber Co. Stretching rubber hydrochloride film. 819,324.

Esso Research and Engineering Co. Aromatic olefin polymerization process. 819,451.

Dow Chemical Co. Non-corrosive compositions comprising polymerized olefins prepared with certain catalytic metal compounds. 819,277.

T. W. Mullen. Tyre repair. 819,562.

Sandoz Ltd. Emulsion polymerization. 819,399.

Maschinenfabrik Oerlikon. Production of hardenable epoxy resin compositions. 819,191.

E. I. Du Pont de Nemours and Co. Coated fabrics. 819,460.

Hercules Powder Co. Processes for the polymerization of 3, 3-disubstituted oxetane. 819,407.

De Bataafsche Petroleum Maatschappij N.V. Preparation of epoxy compounds and infusible products. 819,194.

Pirelli S.p.A. Pneumatic tyres for vehicles wheels. 819,553.

Polymer Corporation Ltd. Modified polymer. 819,293.

Chemische Werke Huls A.G. Production of vinyl esters. 819,449.

De Bataafsche Petroleum Maatschappij N.V. Process for the conversion of hydroperoxides of secondary alkyl aryls into phenols and ketones. 819,450.

Rubber Journal and International Plastics **CLASSIFIED ADVERTISEMENTS**

APPOINTMENTS VACANT

6d. a word, Minimum 10/-. Box 2/-.

AN interesting appointment becomes available with an organization of national reputation for a graduate who will work on research and development problems in mastics and sealants. Previous experience in rubbers and plastics preferred but not essential. We seek a man with drive and initiative, able to appreciate the excellent prospects in a rapidly expanding organization. The company work a five-day week, a pension scheme is available and a four-figure salary will be paid. Applications in full detail should be addressed to:—The Managing Director, Evode Limited, Common Road, Stafford. Marked 'Private and Confidential.' (318)

COMPANY expanding its PVC compounding and paste-making activities requires chemist with relevant experience. Vacancy occurs February, 1960.—Box 319. (319)

EBONITE technologist wanted for factory in London area, to take charge of compounding and process control of ebonite mouldings. This vacancy arises because of retirement and the successful candidate could expect a starting salary commensurate with qualifications and experience, but not less than, say, £900-£1,200 p.a. There are very real prospects of advancement both in salary, also in status and range of responsibilities for the right man. Applications, giving age, qualifications and details of experience will be treated in confidence.—Box 320. (320)

APPOINTMENTS VACANT

(continued)

BTR

require in London a

SENIOR PLASTICS TECHNOLOGIST

with experience of

MOULDINGS, EXTRUSIONS and/or COMPOUNDING.

Graduates or equivalent (at least H.N.C. or A.P.I. standard) (age 26-40) should have a flair for Product Development and wish to extend their administrative abilities. Here is an opportunity to take responsibility for the activities of a selected team in a newly created DEVELOPMENT laboratory. Good salary, pension scheme, also excellent prospects for status and financial advancement.

Send full details of education, experience, age, etc., indicating salary expected to:—

Group Personnel Officer (Ref. SPT)
BTR Industries Ltd.,
Herga House, Vincent Square,
London, S.W.1. (326)

APPOINTMENTS VACANT

(continued)

COMPANY specialising in sponge and general mouldings, require chief chemist to take charge of existing laboratory and staff. Candidates should be aged between 30-40 years and have qualifications not less than A.I.R.I. standards. Salary will be commensurate with qualifications but not less than £1,500 p.a.—Full details of past emplyoment to Box 299. (299)

FOREMAN required for trimming department of rubber company. In addition to rubber experience, mechanical knowledge would be an advantage. Pension and life assurance scheme. Five-day week.—Apply Andre Rubber Co., Ltd., Kingston By-Pass, Tolworth, Surbiton, Surrey. (287)

QUALITY control. A large and progressive rubber manufacturing company in South Scotland requires an assistant superintendent for quality control. Candidates aged 26-35 should have had experience in general rubber goods manufacture and be able to deputise for the manager in meeting customers when required. A generous salary will be offered to the selected candidate. Company benefits include contributory pension scheme, free life assurance and assistance with removal expenses. Application giving full particulars including present salary should be addressed to:—Box 322. (322)

RUBBER manufacturers (London area) require works chemist to take charge of laboratory. Experience in the manufacturing and processing of resin rubber sheeting for the shoe trade essential. Permanent position. Apply giving full details of previous experience, qualifications, and salary required to Managing Director.—Box 305. (305)

SENIOR assistant, 22-30 years of age, (free from National Service obligations) required to control physical testing section in laboratory of Greengate and Irwell Rubber Co. Ltd., Irwell Works, Salford, 5. Previous experience of physical testing essential, and education at L.I.R.I. standard preferred.—Apply giving full details of age, education, experience and salary required to Chief Chemist. (324)

TECHNICAL director. An important company manufacturing a wide range of specialised bonded and other mechanical rubbers invites applications for the position of technical director. The appointment covers direction of the large and well-qualified staff with extensive laboratory facilities and the control of technical processes and quality of all components, together with the research and development programmes. Great importance is attached to the personal and administrative qualities of applicants, although a wide experience in the rubber or kindred industries would be an obvious asset. Applications, which will be treated in the strictest confidence, should be addressed to the Managing Director.—Box 289. (289)

ARTICLES FOR SALE (SECONDHAND)

6d. a word, Minimum 12/6 **Box 2/-**

THREE Carter high-speed braiding machines. K4. Intermix with 110 h.p. drive and conveyor. Pair of 50in x 18in. S.G. mills with 140 h.p. drive. 450-ton 6-daylight press by Shaw, platens 54in. square; 24in. dia. ram.—Reed Brothers (Engineering), Ltd., Replant Works, Woolwich Industrial Estate, London, S.E.18. Telephone: Woolwich 7611/6. (327)

MISCELLANEOUS

6d. a word, Minimum 12/6 **Box 2/-**

'COTSWOLD' dipping machines and circulating tanks for latex and PVC. New catalogues now available on request.—Lionel Hook and Sons, Ebley, Stroud, Glos. Tel.: Stonehouse 614/5. (380)

MANUFACTURERS of roughing machines for rubber sheeting, sponge rubber, splitting machines, leather cloth plant, embossing plates and rollers, spreading machines and presses.—G. L. Murphy, Ltd., Imperial Works, Menston, Nr. Leeds. (238R)

APPOINTMENTS VACANT

BTR

Arising from Promotion, Relocation or Retirement, these vacancies exist and in each case may be expected to provide opportunities for advancement, either at the same location or by subsequent transfer within the BTR Group.

Whilst we are looking for men (age 25-40) with A.I.R.I., A.P.I., H.N.C., or of degree standard, preferably with some experience, we will also consider young men who wish to obtain higher qualifications by part-time study.

BURTON-ON-TRENT

PHYSICIST/CHEMIST (Ref. BPT) to take charge of test laboratories.

RUBBER TECHNOLOGIST (Ref. DCB) to carry out DEVELOPMENT work on new, also established, products from a wide range.

LEYLAND

RUBBER TECHNOLOGISTS (Ref. LT) for process control and product development of HOSE, and CONVEYOR BELTING.

LONDON

DEVELOPMENT DESIGNER (Ref. HPH/D) to design HOSE COUPLINGS and assemblies for HYDRAULIC and PNEUMATIC applications.

SENIOR RUBBER TECHNOLOGISTS (Ref. SRT) for compounding, process control and product development of ROLLER COVERINGS.

SENIOR EBONITE TECHNOLOGIST for compounding, process control and product development of EBONITE MOULDINGS.

SENIOR PLASTICS TECHNOLOGIST for technical control and product development of increasing range of industrial products.

Applications, which will be treated in strict confidence, should include tabulated details of education, experience, etc., and advertisement reference. Send to:—

The Group Personnel Officer
BTR INDUSTRIES LTD.
Herga House, Vincent Square, London, S.W.1 (218)

ARTICLES WANTED

6d. a word, Minimum 12/6 **Box 2/-**

HYDRAULIC accumulator wanted. Capacity between 60-100 gallons at 1,500lb. pressure.—Full particulars to Box [illegible]

APPOINTMENTS WANTED

6d. a word, Minimum 10/- **Box 2/-**

RUBBER engineer and technical director. Age 43. Twenty years' experience in mechanicals, press and mould design, production development and management. Shortly returning to the UK seeks congenial employment in expanding concern where his initiative, ability and experience can be fully employed.—Reply Box 323.

wants! ★★★★★★★★★★★★★★★★★★ **MUST BE PREPAID**

Address Box Number replies to:
BOX NO.—, RUBBER JOURNAL AND INTERNATIONAL PLASTICS
Maclaren House, 131 Great Suffolk Street, London, S.E.1

t

137

A